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THE ROLE OF THE MEDICAL TECHNOLOGIST IN THE CYTOLOGIC DIAGNOSIS OF CANCER

CHARLOTTE M. STREET*

The cytologic diagnosis of cancer is a method based on the identification of exfoliated malignant tumor cells in smears prepared from various body fluids. The earliest application of this method was in the vaginal fluid. In 1928,[1] while studying the vaginal secretion under various physiological and pathological conditions, Papanicolaou noticed the presence of cells with distinctly abnormal characteristics in cases where there were uterine carcinomas. Following this, vaginal smears of a large number of women with known cancers were examined to determine whether a diagnosis of malignancy could be made by this means. The results of these studies were published by Papanicolaou and Traut in 1943.[2] Since then, many others have been investigating the feasibility and reliability of this method of diagnosing cancer of the female genital tract.

When it became apparent that a diagnosis of malignancy could be made by the identification of malignant cells in the vaginal secretion, the same method was applied to other secretions and excretions, such as urine, sputum, bronchial and gastric aspirates, rectal washings, pleural and peritoneal fluids, and many others.

* Research assistant, Cytologic Laboratory, under the direction of Dr. George N. Papanicolaou, Cornell University Medical College, New York, N. Y.

Now, the method of cytologic diagnosis of cancer in many parts of the body is fast becoming accepted as an accessory diagnostic procedure, to be corroborated by biopsy or X-ray, and as a useful screening tool in cancer detection clinics or in periodic check-ups by the practicing physician. Pathologists are being overwhelmed with requests for smear examinations which are more time-consuming than tissue examinations. As a result, the role of the medical technologist in this field is becoming increasingly important.

That role is a dual one: first—the technical part—the preparation and staining of smears, and second—the screening or preliminary examination of the smears and marking of suspicious or abnormal cells for final evaluation by the pathologist or trained cytologist. Although the technical aspect of the work may not sound as interesting as the microscopic examination, it is of equal or probably greater importance, since it is difficult and often impossible for a pathologist to make a correct diagnosis on the basis of poorly prepared and poorly stained smears. The technique is fairly simple and easy to learn, but screening is more arduous and takes weeks of study of normal, atypical, and malignant cells before one can begin to master the recognition of the various types of cells.

The technique of collecting specimens, and preparing and staining smears varies somewhat in different laboratories, but the general principles are much the same. The methods described here are those which have been developed in the laboratory at Cornell Medical College.

Vaginal, cervical and uterine smears are prepared and fixed by a doctor or nurse and sent to the laboratory for staining. They should not be made after a douche or bath. Vaginal secretion is aspirated with a dry glass pipette equipped with a strong rubber bulb, expelled on to a clean slide, and spread in a uniform smear. The slide is then immersed immediately, without allowing the smear to dry, in a fixing solution of equal parts of 95% alcohol and ether. Endocervical or endometrial fluid is aspirated by means of a flexible metal laryngeal cannula and a rubber bulb or syringe, and smears prepared and fixed in the same way. It is also desirable to obtain material for smears directly from the cervix with a cotton applicator or wooden spatula. Fixation is accomplished in 15 minutes, but the smears may be left in solution for several days.

After proper fixation, the smears are stained as follows:

1. Transfer slides directly to 80% alcohol, then through 70% and 50% alcohols to distilled water, leaving them in each solution long enough to clear.

2. Stain in Harris haematoxylin for 6 minutes.

3. Rinse in distilled water and then dip 6 times in 0.25% aqueous hydrochloric acid.
4. Transfer slides to running tap water for 6 minutes.
5. Rinse in distilled water, and run up through 50%, 70%, 80% and 95% alcohols, leaving in each solution a sufficient length of time to clear.
6. Stain in OG6 for 1½ minutes.
7. Rinse in two changes of 95% alcohol.
8. Stain in EA36 for 1½ minutes.
9. Rinse in three changes of 95% alcohol.
10. Dehydrate and clear in absolute alcohol, absolute alcohol and xylol equal parts, and xylol.
11. Mount with a cover slip, using Permount or any suitable mounting medium.

During the staining process ,the slides should be transferred rapidly from one solution to another without allowing the smears to dry at any time.

The Harris haematoxylin is made up without acetic acid and diluted with an equal amount of distilled water before use. It should be filtered into a dark bottle when not in use, and reinforced regularly with undiluted stock solution to maintain uniform staining results.

The cytoplasmic stains OG6 and EA36 have been described in Science, April 24, 1942.[3] They are both made with 95% alcohol as a solvent. OG6 is a 0.5% solution of Orange G slightly acidified with phosphotungstic acid. EA36 is a combination of various amounts of 0.5% solutions in 95% alcohol of Light Green, Eosin and Bismarck Brown.

In smears stained by this method, nuclei are dark blue, the cytoplasm of basophilic cells pale greenish-blue, and that of acidophilic cells shows different gradations of pink and orange depending on the degree of cornification or keratinization. The differential staining of the cytoplasm of acidophilic cells is of particular advantage in the diagnosis of certain squamous carcinomas, as those of the cervix or lung, since some of the malignant cells show a preference for the orange color and stand out strikingly in the microscopic field. The use of alcohol as a solvent contributes to the transparency of the staining. Thus, even in thick smears, where there are groups of overlapping cells and abundant mucus, the individual cells can be readily distinguished.

Smears of other fluids are prepared in the laboratory from specimens which have been mixed with alcohol as soon as obtained. Sputum, which must be a deep cough specimen, is collected directly into 70% ethyl alcohol in order to fix and preserve the cells, and also to prevent growth of bacteria and fungi. All other fluid specimens are mixed immediately with an

equal volume of 95% ethyl, isopropyl or clean methyl alcohol for fixation.* Urine may be a voided or catheterized bladder specimen, a ureteral specimen, or specimens voided before and after prostatic massage, depending on the suspected site of the tumor. It must be catheterized in female patients to avoid contamination by vaginal secretion. A gastric aspirate or lavage is collected after fasting. In cases of suspected malignancy of the rectum or colon, the patient is given a strong cathartic at night, an enema the next morning and two to three hours later, saline washings are collected. Other specimens which may be sent for examination are bronchial aspirates or washings, duodenal drainage, prostatic secretion, pleural, peritoneal, or cystic fluids, etc. The amount desirable is from 50 to 100 cc., but will of necessity be smaller in some instances, such as ureteral specimens, bronchial aspirates and prostatic secretion.

All specimens should be sent to the laboratory and worked up as soon as possible, more particularly gastric fluids because of the rapid digestion of cells. If delay is unavoidable, the specimens should be kept in the refrigerator.

Smears of sputum are prepared on slides which have been previously coated with a thin film of Maver's albumen in order to make the specimen adhere to the slide. A small amount of sputum is crushed slightly between two slides, using just enough pressure to soften and spread it into a fairly thin, uniform smear, but not enough to break down the cells. If there are any bloody portions in the specimen these should be selected. The smear is allowed to dry very slightly and then immersed carefully in alcohol-ether for fixation for a minimum of one hour before staining.

All other specimens are centrifuged at medium speed for 30 minutes, the supernatant liquid decanted, and smears prepared from the sediment and fixed in alcohol-ether by the same method as for sputum. Only slight pressure is usually necessary in spreading sediments. If smears cannot be prepared immediately, the sediment is covered with a few cc. of absolute alcohol and stored in the refrigerator.

The method for staining sputum and sediment smears is the same as that for vaginal smears except that a counterstain designated as EA65 is substituted for EA36. EA65 is prepared by the same formula as for EA36 except that the Light Green stock solution is half the strength of that used in EA36. The reason for this is that sputum and sediment smears are often more dense than vaginal or cervical smears and the stronger green solution stains them too deeply. These smears must be

* Recently, we have been using 50% alcohol instead of 95% alcohol for fixation of pleural and peritoneal fluids and have found that there is less precipitation of proteins by so doing.

handled very gently during the staining process as the cells are easily detached. Smears of sputum or sediment will stick to the slides better if left over night in alcohol-ether.

It may not be necessary to mention this, but the importance of proper marking of all specimens and slides cannot be stressed too much, particularly in cases where bronchial or ureteral specimens from both right and left side are submitted for examination. The responsibility of the technician is very great in this respect, as an error in marking a slide might lead to removal of a normal lung or kidney instead of the diseased one.

In the matter of screening the smears, it must be emphasized that the medical technologist should not take the responsibility for a final report. The reason for this is that, although positive smear reports should be confirmed by biopsy before a major operation is undertaken, in some cases it is impossible to obtain tissue for examination and operations have been performed on the basis of several successive positive smear reports. In such cases an error in judgment would be extremely serious, and a technician should not be asked to assume such a responsibility.

In screening smears a mechanical stage, both low and high dry objectives, and 15x widefield oculars should be used. The smear should be examined thoroughly with low power and if any suspicious cells are seen they should be studied with high power to determine whether there are any abnormal features in the nuclei or cytoplasm. When a careful scrutiny of the smear with low power fails to reveal any abnormal cells, parts of the smear should be examined with high power, in order to make sure that no single or small atypical cells have been missed.

A uniform method for marking cells should be adopted in each laboratory in order to avoid confusion. Our system is to place the slide in the microscope with the labelled end at the right, and put an ink dot on the slide above the abnormal cell as seen through the microscope. A circle with ink on the under side of the slide is also recommended as it facilitates locating the marked cell.

Time does not permit the description of all the criteria of malignancy but I will try to mention a few of the more important characteristics of malignant cells which one should look for in examining smears. They are: clusters of cells showing anisocytosis and anisokaryosis; vacuolization of the cytoplasm; hyperchromatic nuclei with clumping of the chromatin and prominent nucleoli; engulfment of cells; enlargement of the nucleus in relation to the amount of cytoplasm and very often enlargement of the cell as a whole; and bizarre cellular forms.

I should like to emphasize again a few points to be taken into consideration by the medical technologist who enters this comparatively new field of exfoliative cytologic diagnosis. The

technique must be as perfect as possible. Extreme care must be taken to avoid errors in labelling specimens. If a specimen is insufficient, poorly preserved or shows suspicious but not conclusively malignant cells, another one should be requested immediately. Proficiency in screening requires long study and experience. One must be conservative and not over-anxious in calling a smear malignant, as a false positive report is a much more serious error than a false negative one. Last, but not least, a technician should **never** take the responsibility of giving a final report but should always be checked by a pathologist or cytologist.

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SEASONAL VARIATION IN THE RESPONSE OF LEOPARD FROGS TO INJECTIONS OF PREGNANCY URINE

L. B. SOUCY, M. T. (ASCP)
Plainview Sanitarium & Clinic, Plainview, Texas

In the performance of 512 male frog and toad tests during a period of fourteen and one-half months (September 14, 1948 to December 3, 1949), a definite seasonal variation in the response of leopard frogs (Rana pipiens) to injections of pregnancy urine was noted. The sensitivity of the animals was greatly reduced during the summer months with a resultant loss of accuracy.

From mid-September, 1948, to June, 1949, reactions were quite satisfactory. Positive tests were always characterized by strong, rapid reactions; that is, heavy deposits of spermatozoa were usually found in thirty minutes to one hour and invariably within two hours. The accuracy, when first morning urine from women in the third week to sixth month of gestation was used, was 100%. During the summer, particularly July and August, positive reactions were consistently weak and delayed. The number of sperms per field was often less than one hundred instead of thousands, and two to three hours instead of thirty minutes to one hour were often required for the demonstration of spermatozoa in the frogs' urine. In contrast to the accuracy of 100% for the first nine months of investigation, accuracy during the summer fell to about 70%. Then in October and November of this year consistently strong and rapid reactions were again obtained. As far as is now known, there have been no false negative tests during these two months.

Since the technique, maintenance procedures, source and types

of frogs, and all factors which could contribute to the variability of results were controlled and kept constant at all times, it seems that cyclic spermatogenesis was the sole cause of untoward reactions in our laboratory during the summer. The testes are evidently at rest and incapable of producing spermatozoa at that time of year.

In support of the laboratory findings, physical changes were noted which give credence to the claim of cyclic spermatogenesis. The secondary sex characters of leopard frogs are generally well known. During most of the year the thumb of the male has a characteristic "bulge" which makes differentiation from the female quite simple. In the summertime, however, this "bulge" is greatly reduced, so that even experts cannot make correct sex identifications on the basis of this character. The world authorities on frogs, Dr. and Mrs. A. H. Wright, were consulted in this matter and they agreed that the thumb cannot be used as a criterion for sex identification at certain times of year.[1]

A short while after the mating season, the secondary sex characters become rather obscure. It is when these differentiating marks are not prominent that false negatives or weakly positive reactions occur, even though the test animals are mature males.

Does this mean then that the use of the leopard frog as a test animal should be discontinued? Not at all. It has proven much too valuable to be discarded. Does it mean that time-consuming concentration procedures must be employed? Not at all. There are too many disadvantages to concentration methods. There is a much more simple solution to the problem. It is simply to employ other species of frogs or toads which are known not to have a concurrent period of gonadic rest.

Cyclic spermatogenesis most likely occurs in different species and in the same species at different times of the year under different climatic and geographic conditions. The only requirement that needs to be satisfied for reliable results is that the two or more species used have different cycles. Three types of toads were tested and reacted satisfactorily last summer at the time that frogs were reacting poorly: The Great Plains Toad (Bufo cognatus), American Toad (B. americanus) and Southern Toad (B. terrestris). These three toads gave consistently correct positive results with urine which was producing false negative leopard frog tests.

To cite an example, a specimen of urine, obtained from a woman whose menses were eight days overdue, was submitted to the laboratory for a pregnancy test. A leopard frog and a Great Plains toad were each given an injection in the prescribed amount. The frog was negative and the toad was positive. Then four leopard frogs (two had been stored in the refrigerator at

2 to 8 degrees centigrade and two had been kept at room temperature; one from each group was collected locally while the other for each group had been shipped from Wisconsin), one Great Plains toad, one American toad and one Southern toad were all given injections of this same urine. All the frogs were negative at one, two, three and four hours, and all the toads were positive within one hour. This specimen of urine, without preservative, was placed in the freezing compartment of the refrigerator, and five weeks later, when the thumbs of frogs again appeared swollen, the injection of two leopard frogs produced positive reactions within one hour in both animals. One of these two had been captured only two days previous to the test and showed a typical male thumb. The other frog was one of those which had been used in the first experiment and had been kept at room temperature the entire three months of its captivity.

These findings seem to leave little doubt as to the occurence of cyclic spermatogenesis in leopard frogs and they speak well for the reliability of toads during the inactive phase of the cycle. The leopard frog is undeniably a valuable test animal but the limits of its reliability need to be defined. It is unfortunate that research institutions have not awarded this method of pregnancy testing a little more attention. There is much need for standardization of procedure. Those laboratories reporting low rates of accuracy are found upon questioning to be deviating from the technique[2] which was followed in obtaining the results given here. It is not reasonable to expect the same results unless exactly the same technique is followed.

Using unmodified urine only, a false positive frog or toad test was not encountered in any of the 512 specimens tested, and false negatives were virtually eliminated through the use of at least two animals of different species for each test. False negative results were obtained with urine which was collected too early (menses less than one week overdue) or too late (last trimester) in pregnancy. Also, in the proper range of amenorrhea, false negatives were obtained when random specimens instead of first morning urine was used. With urine specimens collected upon arising in the morning in the third week to sixth month of gestation, the accuracy in the combined species (toads and frogs together) was 100%.

This communication may be of little value to those who have encountered technical difficulties in performance of frog tests. The purpose of this paper is to point out a very important factor —cyclic spermatogenesis—which seems to have been completely overlooked by American workers.* Though Robbins and Parker,[3]

* Brody (Brody, H: Am. J. Obst. & Gynec. 57:581, 1948) also noted a lack of sexual dimorphism in leopard frogs during the summer, and he reported a high incidence of false negatives even though he employed a concentration method.

and Wiltberger and Miller[4] mentioned cyclic spermatogenesis in their early works, they offered no conclusions. Cutler[5] expressed the belief that it did not occur. It is also to be noted that Cutler,[5] in the distribution of reprints, modified his technique and reading of reactions so that one is led to wonder about the value of concentration procedures.

At a later date it is intended to report the detailed results of toad tests, the comparative sensitivity of toads, frogs, rabbits and mice, the merits of concentration methods, pitfalls of technique, etc.

Technologists who obtained a low accuracy rate in leopard frog tests last summer may expect better results now that the period of sexual rest for these animals is over. However, a high rate of accuracy can be obtained only with good technique and with properly conditioned animals. It is hoped that the material which will soon be offered for publication will help to clear up some of those problems.

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MECHANISM OF LIVER FUNCTION AND METABOLISM

LOUISE STINSON GARVER, B.S., M.T. (ASCP)
Physicians' Diagnostic Laboratory, Hermann Prof. Bldg., Houston, Texas

Most discussions presented on liver functions deal with the topic from the standpoint of the interpretation of the findings in various laboratory procedures to diagnose a particular disease process. The results obtained mean nothing to the Technologist if the mechanism of the liver and the metabolism of bilirubin are not thoroughly understood.

The liver is the most complex and important organ of the body because it has secretive, excretive, metabolic, detoxification, and blood coagulation purposes to fulfill.

As a secretive process, the liver assists in absorption and digestion by the production and re-secretion of bile acids and bile salts. These compounds are important in that they stimulate the flow of bile salts themselves, and they in return provide the organ with a readily available supply of the major constituent of the bile. These salts occur in man as a conjugation of the free bile acids with amino acids, glycine, and taurine; but a small amount of unconjugated acids and salts may be found

normally. Conjugation of these chemicals in bile is dependent upon the activity of the liver cells themselves and use is made of this factor in the Hippuric Acid test. The introduction of a given amount of Sodium Benzoate into the body measures the ability of the liver to eliminate this extraneous substance by its conjunction with glycine to form Hippuric Acid and excrete it in proportion to the amount of free bile acids present.

The major components of formation and excretion of the liver are bile and bile pigments. The pigments include biliverdin and bilirubin, of which bilirubin is predominant. The detection of these pigments by the Gmelin test on urine and feces is based upon the oxidation and reduction of the pigments with nitric acid to give a divergence of colored compounds as diagramed below:

$$\underset{\text{(Brown)}}{\text{Urobilin}} \xleftarrow{H_2} \underset{\text{(Red)}}{\text{Bilirubin}} \underset{H_2}{\overset{O_2}{\rightleftharpoons}} \underset{\text{(Green)}}{\text{Biliverdin}} \xrightarrow{O_2} \underset{\text{(Blue)}}{\text{Bilicyanin}} \xrightarrow{O_2} \underset{\text{(Yellow)}}{\text{Choletelin}}$$

$$O_2 \uparrow\downarrow H_2$$

$$\underset{\text{(Colorless)}}{\text{Urobilinogen}}$$

These pigments are derived from the heme of the hemoglobin of the erythrocytes. They are formed in the reticulo-endothelial cells and since some are found in the liver as Kupffer cells, consequently, a small fraction of bilirubin originates in the liver itself. Most of the pigment, however, is produced by the reticulo-endothelial cells of the spleen, marrow, and others parts of the body. There, hydrolysis of hemoglobin to heme to globin takes place, and the removal of iron resulting in the formation of biliverdin. It is then transported to the liver for excretion. As the blood passes through the liver, the hepatic cells not only remove the biliverdin from it but at the same time effect some chemical change. In the first place, for the most part, biliverdin is reduced to bilirubin. In the second place, the hepatic cells change the state of the bilirubin from a colloidal state perhaps to one that is united with a protein. At any rate, the liver cells split this protein complex and transform the colloidal bile pigment to a crystalloidal state.

Crystalloidal, or altered bilirubin, is readily secreted into the bile. It flows from the liver to the gall bladder, and from there into the intestinal tract. When it reaches the intestines, bacterial action causes the reduction of bilirubin to urobilin. Much of this passes out into the feces, giving it the brown color, due to stercobilin which is thought identical with urobilin. The fraction that is not passed from the body is further reduced to urobilinogen and re-absorbed by the intestines into the liver. Here it is reconverted to bilirubin, but a small fraction remains unchanged and is excreted into the urine.

This process may be represented both schematically and diagrammatically as below:

Schematically:

Biliverdin

$H_2 \downarrow\uparrow O_2$

Bilirubin-protein (?)

Liver action

Bilirubin (Bile) —H→ Urobilin (Intestine) → Stercobilin (Feces)

Bacterial action

Urobilin (Intestine) → Urobilinogen (Intestine)

Urobilinogen (Intestine) —O→ Urobilin (Urine)

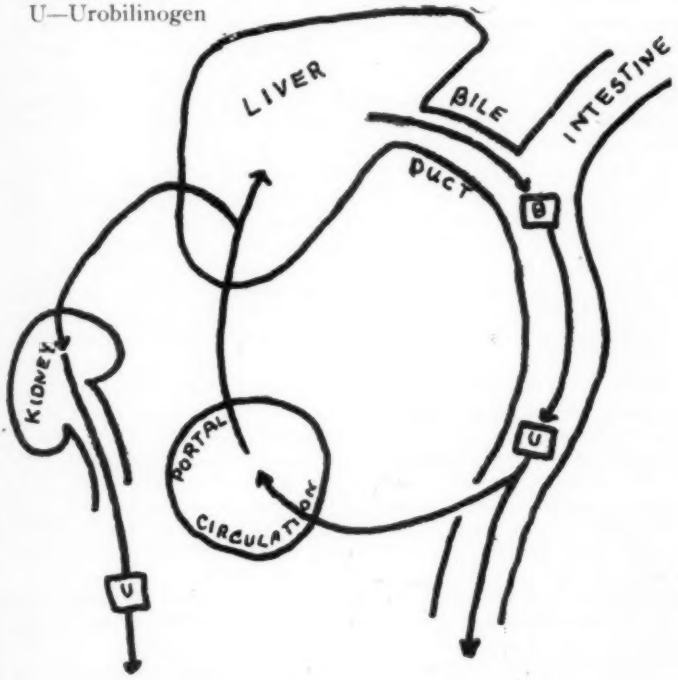
Urobilinogen (Intestine) → Urobilinogen (Urine)

Urobilinogen (Intestine) → Bilirubin (Liver)

Diagrammatically:

B—Bilirubin

U—Urobilinogen



A small amount of bilirubin is normally present in the blood serum to give it the characteristic straw color. Should some factor cause the over-production of bilirubin, the pigments will be found in the serum in proportion to the excretory ability of the liver. Thus, the icterus index is one of the major points of consideration because it is usually the first indication of an overburdened liver. The quantitative bilirubin test, however, gives a more definite index as to the exact amount of altered or unaltered bilirubin present.

In considering the types of jaundice, there are four general classifications, including, 1) Hemolytic, 2) Obstructive, 3) Hepatocellular, and 4) Mixed.

The first type, or Hemolytic Jaundice, is not a liver disease in itself, but due to various agents that cause an over-destruction of erythrocytes outside the liver. The organ is unable to handle the overproduction of bilirubin and a jaundice results. The causative factors for this condition are poisons, bacterial toxins, mismatched transfusions, malaria, and certain types of anemia. Even though these factors may be the essential cause, some hepatic injury or dysfunction may be an accompanying factor.

Diagnosis of this type depends upon the blood picture; increased reticulocytes; fragility test; congenital history of patient; increased bilirubin in blood; increased urobilinogen in urine and feces; and the absence of bilirubin in the urine.

In Obstructive Jaundice, the bile present in the gall bladder is not allowed passage into the intestine and it backs up into the circulating blood. The bilirubin present will be of the altered or crystalloidal state because it has been converted by the hepatic cells. Therefore, the outstanding features of this disease are characterized by the presence of altered bilirubin in serum to give a direct Van den Berg reaction; the decrease or absence of urobilinogen in urine and feces; and the presence of bilirubin in the urine.

When there is destruction to the cells of the liver, the resulting jaundice is termed "Hepatocellular." In this type, there is an accumulation of the colloidal or unaltered bilirubin in the blood. Bilirubin in this state cannot be eliminated by the diseased liver nor the kidney. A great portion is emptied into the intestines, where a small amount is passed into the feces unchanged, but most of it is oxidized to urobilinogen. It is then re-absorbed into the liver but the dysfunctioning liver is incapable of reconverting all the urobilinogen to bilirubin and it is eliminated by the kidneys into the urine. If the urine is allowed to stand, oxidation takes place and urobilin is formed; therefore, immediate testing is important to detect the amount present.

The following tabulated points may be considered some of

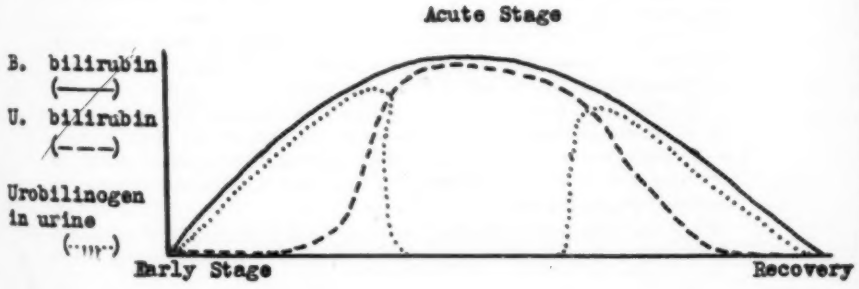
the major differences between Hepatocellular and Obstructive Jaundice:

HEPATOCELLULAR	OBSTRUCTIVE
1. Unaltered bilirubin in serum, giving delayed or indirect Van den Berg.	1. Altered bilirubin in serum, giving immediate or direct Van den Berg.
2. Increased icterus index.	2. Increased icterus index.
3. Unaltered bilirubin in feces.	3. Decreased or absence of urobilinogen in urine and feces.
4. Increased urobilinogen in urine.	4. Decreased bile salts from intestines.
5. Increased urobilin and urobilinogen in feces.	5. Decreased Vitamin K.
6. Cholesterol not elevated.	6. Often a parallel rise in total blood cholesterol and phosphatases with the serum bilirubin.
7. Hippuric acid decreased.	7. Hippuric acid normal.
8. Prothrombin often decreased with response to Vitamin K poor.	8. Decreased prothrombin time with response to Vitamin K satisfactory.

Even though most diseases of the liver fall under these two general types, one must keep in mind the fact that there may occur an overlapping of these entities. In these instances, the laboratory findings will vary as the disease progresses. The major reason for this is due to the regenerative power and the resumed functioning ability of the liver cells themselves.

If the existing process is a degenerative or Hepatocellular type, the damage to the cells may become diffuse and many of the laboratory manifestations will have many of the features of the Obstructive type. This is due to the fact that the liver cells are injured to such a degree that their excretory functions are almost completely inhibited, but are capable of regeneration. This results in an "intrahepatic obstruction," or a mixed type of jaundice.

The characteristic aspects of this stage is the increase and decrease of the urine bilirubin with the rise and recession of the intensity of the jaundice; the absence of urobilinogen in the urine during the most active stage; and the acholic appearance of the stools. This is better understood when demonstrated by diagram as below:



Some liver dysfunctions exhibit this type of picture, and the appearance of bile-stained stools and the resumed urobilinogen excretion in the urine indicates improvement of the individual.

The metabolic processes of the liver include that of proteins, carbohydrates, nitrogens, fats, vitamins, pigments, and porphyrin. The constituents that merit most importance are the carbohydrates, proteins, vitamins, and pigments, because there are tests available to make use of them in differential diagnosis of the liver diseases.

The Galactose Tolerance test, utilizing the carbohydrate metabolism, is of importance in early Hepatocellular Jaundice. It is of little or no value in late Hepatocellular or Obstructive Jaundice.

Some of the tests based upon the protein metabolism fraction include the Total Protein and A/G Ratio; the Cephalin-Cholesterol Flocculation; the Colloidal Gold; and the Thymol Turbidity. Even at the best, these tests are less reliable than those based upon the bile and bile pigments because of the sensitive colloidal state of the reagents used, and the interference of other diseases. However, a diagnosis once established, they aid in determining the progress of the patient.

The reticulo-endothelial cells of the liver possess the ability to remove dyes or other chemicals that are of an extraneous nature. This process may be carried out by conversion, excretion, storage, or conjugation, and the rapidity of removal is proportional to the activity of the hepatic cells. The administration of Sodium Benzoate, Bromsulphalein, or Rose-Bengal will give an index to the cellular damage present. The primary importance of this type of test is to assist in the study of the liver when there is no jaundice present.

The essential factors in blood coagulation, fibrinogen, and prothrombin are manufactured in the liver. In order for this protein-fraction to be formed, the liver must absorb Vitamin K from the intestine or a deficiency of prothrombin will result.

An abnormal or prolonged prothrombin activity is a good index to liver dysfunction. First a determination is made to ascertain the amount present at a given time. Then large doses of Vitamin K are given and another determination is made. If, because of cellular destruction, Vitamin K is not absorbed, the prothrombin activity remains abnormal.

On the other hand, if an obstruction is present, the absorption of Vitamin K from the intestines is inhibited and thus creates a deficiency in the liver. If it is injected intramuscularly, it reaches the liver through the blood and a subsequent rise to normal of prothrombin follows.

Taking into consideration the liver as a whole, it will be noted that it is very complex and diversified in its mechanism. It is

capable of function and regeneration simultaneously; in fact, experiments prove that the removal of 90% of a dog's liver does not decrease its functions or metabolism enough to be evident in any laboratory findings. This capacity will often mask the true condition existing in the organ. Therefore, the mode of differentiation weighs most heavily upon the clinical symptoms and the attending physician.

Only when the process has reached the threshold of laboratory importance, can the technologist be of assistance. It is then the duty of each person to aid the doctor by knowing enough about the functions of the liver to perform the procedures with intelligence and assiduity.

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USE OF PENICILLINASE SCHENLEY IN ROUTINE CULTURES FOLLOWING ADMINISTRATION OF PENICILLIN

LOIS BYLER LINN, A.B., M.T. (ASCP)
From the Laboratory of Cottage Hospital, Santa Barbara

The bacteriological examination of blood and other body fluids of penicillin-treated patients is often complicated or falsely negated because penicillin-sensitive bacteria will not grow in the presence of inhibitory concentrations of the drug. This difficulty is sometimes avoided by taking bacteriological specimens after an interval of interrupted medication, particularly in cases such as wound treatment where the drug is absorbed rapidly following topical application. Frequently, however, administration of penicillin is desired more or less continuously, and since the application of heat or chemicals to inhibit the drug present in specimens for culture also destroys the bacteria, a means of inhibiting the drug only is required.

In 1940, Abraham and Chain[1] noted that a number of saprophytic and commensal bacteria inhibit penicillin. They named the active penicillin-inhibiting agent "penicillinase." Subsequently many substances were investigated as penicillin inactivators, including amino acds, carbohydrates, growth factors, phospholipids, clarase, takadiastase, pepsin, trypsin, pancreatin, erepsin, purines, and tissue extracts, all of which proved unsatisfactory for general used.[7,9,10,11,12,13] Those which were most effective were of enzymic nature and limited chiefly to bacteria, some

yeasts, actinomycetes, and other fungi.[15] Satisfactory penicillinase has been reported from various bacteria,[3] with paracolon organism,[6] *B. subtilis*,[5,14] *Staph, aureus*,[8] and *B. cereus*,[2] proving particularly effective.

In 1945, Benedict, Schmidt, and Coghill[2] described a method of obtaining a very potent penicillinase from *B. cereus*. They had previously found papain, urease, lysozyme, peptidases from porcine mucosa, emulsin, ficin, trypsin, pure carbonic anhydrase, crude alpha-and beta-amylase and takadiastase to be inactive for destroying penicillin. Concentrated pumpkin protease and high diastatic malt sirup showed some destructive activity, but lyophilized filtrate of *B. cereus* (strain NRRL-B569) proved to have the highest efficacy, with 1 mg. completely destroying 165,000 units of crystalline penicillin in 3 hours at pH. 7.0 and 30° C.

Bacillus Cereus

Bacillus cereus is classified by Bergey[4] as belonging to the Family *Bacillaccae*. It is described as a Gram positive bacillus measuring 1.0-1.2 microns by 3-5 microns, with square ends and occurring long chains. The organism is aerobic and produces large, flat, whitish colonies on agar; some strains produce a yellowish-green fluorescence. The smooth strains are motile and the rough strains weakly motile or non-motile. The organism produces hemolysis on blood agar, liquefies gelatin rapidly, and peptonizes milk rapidly with little or no coagulation. Acetylmethylcarbinol is produced and starch is hydrolyzed. Acid is produced from glucose, fructose, maltose, dextrin, and glycerol, and usually from sucrose and salicin.

Penicillinase Schenley

Penicillinase Schenley is a commercial product suitable for routine laboratory use when inhibition of penicillin is desired in order to culture specimens. It is a penicillin-inactivating enzyme obtained from cultures of *B. cereus*, strain NRRL-B569.[16] Penicillinase Schenley is supplied in 20 cc. vials, each containing 1000 Schenley units.[17] As dispensed for routine laboratory use, one unit of Penicillinase will inactivate one unit of penicillin. The enzyme is precipitated by acetone, ethanol, dioxane, sodium tungstate, and other protein precipitants; it is inactivated by several hours exposure to acetone, alcohol, dioxane and iodacetic acid and by short exposures to ethyl acetate. Penicillinase Schenley is supplied in the form of a sterile powder which is very soluble in water.

Method for Use

1. Remove the metal flap from the vial top; under no circumstances remove the rubber diaphragm. Cleanse with alcohol and dry thoroughly.

2. With heat-sterilized needle and syringe, introduce 10 cc. of sterile distilled water into the vial by puncturing the rubber diaphragm. (Never use chemical agents such as alcohol for sterilizing syringes and needles for use with Penicillinase.)
3. Shake until the powder is completely dissolved. This working solution contains 100 Schenley units per cc.
4. 0.1 cc. of the working solution (10 Schenley units) is added to each 10 to 12 cc. of the medium (liquid or agar).
5. For inoculation the medium containing the enzyme is warmed to 37° C. if liquid (to 45° C. if agar), and the specimen is introduced.
6. After thorough mixing, the petri dish, tube or flask is placed in an incubator at 37° C.
7. Inactivation of penicillin will be complete within one hour and the growth of any viable organism will proceed.
8. Any number of tubes or flasks containing the Penicillinase-medium mixture may be prepared at one time and stored at 5° to 10° C., for periods up to one week. After this period Penicillinase will deteriorate even at refrigerator temperatures.
9. Penicillinase Schenley in the dried form may be kept satisfactorily for 12 months when refrigerated, and 1 month at room temperature; the working solution may be kept at refrigerator temperature 2 to 3 weeks.

Summary

A readily available commercial product of penicillinase is described and the method for its use, when inhibition of penicillin is desired prior to culturing specimens.

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TECHNIQUES USED IN DEMONSTRATING HISTOPLASMA CAPSULATUM

RACHEL M. LEHMAN, M.T. (ASCP)
Instructor in Medical Technology
Indiana University School of Medicine

Dr. Samuel T. Darling, Chief of the Board of Health Laboratory, Panama Canal Zone, reported in 1906, "Histoplasmosis is a term applied to a fatal infection by a protozoan, Histoplasma capsulatum, which has been encountered three times during the past two and one half years in Ancon Hospital."[1] Dr. Darling described the disease as being one resembling kala-azar,-a disease frequent in India, marked by fever, emaciation, splenomegaly, and by the presence of the Leishman-Donovan body in the tissues. The conditions were found only at autopsy.

In 1903 J. H. Wright[2] described micro-organisms found in smears and sections of tissue from an ulcer of the cheek. The patient was a native of Armenia, nine years old. The ulcer had made its appearance some two or three months before the child left Armenia.

Major Leishman,[3] R.A.M.C., described in May 1903 small oval bodies obtained from autopsy spleen smears in a case of chronic dysentery, cachexia, and low fever. He described the bodies as being round or oval and two or three microns in diameter. In Major Leishman's opinion the bodies were residues of trypanosomes.

Captain Donovan[4] found the same bodies in spleen smears collected an autopsy from cases said to have had chronic malaria. There are several other reports of similar findings in cases where kala-azar was suspected in patients who had been in China. Marchand[5] had observed the bodies in cases late in 1902 or early 1903. Laveran[6] examined Donovan's preparation and placed the organism with the Piroplasmata, calling it Piroplasma donovani.

The zoologic status of the Leishman-Donovan body was more closely defined by Leonard Rogers[7] who succeeded in cultivating the body from a spleen puncture without incubation. The bodies became flagellated.

On December 5, 1905, Dr. Darling performed an autopsy on a negro who had died at Ancon Hospital, Canal Zone. On his examination of a peculiar white atypical tubercule in the lung, great numbers of these bodies were found. These were also demonstrated in spleen, liver, and bone marrow of the same patient. He observed an intense invasion of large endothelial-like cells by small round or ovai micro-organisms. The bodies had definite refractile peripheries and their internal structure was not uniform. "This was the first time in the New World that an organism of this type had been found responsible for a fatal infection in a native of the New World."

Major Ronald Ross[8] regarded it as a protozoan organism, resembling somewhat the Leishman-Donovan body, but differing from it chiefly in not containing the chromatin rod usually seen in the Leishman-Donovan body.

After he had seen three cases and had found these bodies, Dr. Darling, of course, made an intent search for the vector. He examined tropical surface waters and did culture some flagellates from these, but none exactly fitted the description of the bodies found at autopsy. He examined fleas, mosquitoes, snakes, and extended his search into mammalian animals such as calves, raccoons, monkeys, rats, and mice. The intestinal tracts in these animals were cultured. At one time he found bodies resembling the Histoplasma capsulatum when the inflamed colon of a rat was studied.

Dr. Darling came to the conclusion that it was a disease of the tropics and one characterized by splenomegaly, emaciation, irregular remittent temperature, and leukopenia. He also thought that arrest of the disease was possible with improved sanitary conditions. In 1908, at the time of Dr. Darling's paper, he felt it was due to patients living in unhygienic regions of tropical America; and he felt that it followed the same course as the disease kala-azar because of the corresponding splenomegaly, emaciation, irregular pyrexia, and leukopenia. The chief difference between the two diseases is the pseudo-granuloma in the lungs.

In January 1906 Strong[9] described an ulcerative cutaneous lesion which simulated the Delhi boil. His patient was a Philippine woman. He described the parasites as resembling "cockle shells," and he believed them to be of the Blastomyces group and that they had not been described previously.

In 1912 Rocha-Lima[10] studied Darling's organism and noted a resemblance of Cryptococcus farciminosus, the fungus of epizootic lymphangitis in horses. This was the first time that the organism was reported to be a fungus. In 1924 Riehl[11] reported from Vienna a case of generalized fungus infection of seven years' duration. In 1926 Riley and Watson[12] from Minnesota and

Phelps and Mallory[13] from Honduras reported cases of histoplasmosis; and after this reports appeared from all over the world, but particularly from the United States.

In 1931 de Monbreun[14] cultivated the organism for the first time. He was able to establish definitely the organism was a fungus and to classify it as Coccidioideaceae and of the genus Posadasia.

By 1947, 88 cases had been reported.[15] Twenty-eight of the patients were children and 20 of these were infants less than 15 months old. According to the report of 1947, only two of the 21 cases reviewed had lived outside of the United States. These cases were reported as exhibiting many symptoms. The chief symptom in 17 cases was splenomegaly, generalized lymphadenopathy in 15 cases, and 16 cases demonstrated hepatomegaly. Blood investigation usually revealed hypochromic normocytic anemia with associated leukopenia and in a few cases thrombopenia. Leukocytosis was present in only two cases. In five cases the blood was sterile on culture; however, the cultures may have been discarded too soon.

From the Division of Vital Records of the Indiana State Board of Health, we find that we have had in our State eleven deaths confirmed by autopsy report due to this infection from 1940-1948. We have had the opportunity at the Indiana University Medical Center to study four cases during 1947-1948. These four cases have been infants under one year of age who had never been outside Indiana, and all presented the same symptoms; namely, severe anemia, low white count (1500 or under), splenomegaly, lymphadenopathy. All of the infants, according to the histories, began with respiratory infections and later became anemic, and finally developed a purpura. In one case blood drawn from a white female infant of 3½ months demonstrated no clotting ability at the end of three hours.

Three of the four cases came to autopsy and our studies were greatly enhanced; however, we had made the diagnosis before confirmation by autopsy by the following methods:

1. Bone marrow study. Smears revealed the large phagocytes containing the yeast-like organisms.

2. Low counts forced us to draw citrated blood which was centrifuged and buffy-coat smears made in order to study the white cells properly. After doing this we were able to see the organisms in the monocytes and on several smears the single yeast-like organisms were found not associated within the white cell membrane.

3. Of course, cultures enabled us to prove we were dealing with Histoplasma capsulatum. Cultures of the blood drawn in broth media and kept at room temperature for at least one month demonstrated the mycelial phase of this organism. We resorted

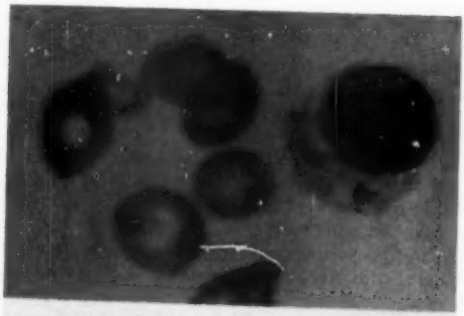

Fig. 1 — Oil immersion photomicrograph of Histoplasma capsulatum in buffy coat smear from peripheral blood.

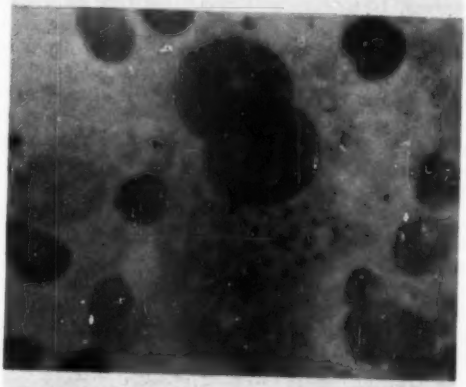

Fig. 2 — Oil immersion photomicrograph of Histoplasma capsulatum from bone marrow aspiration smear.

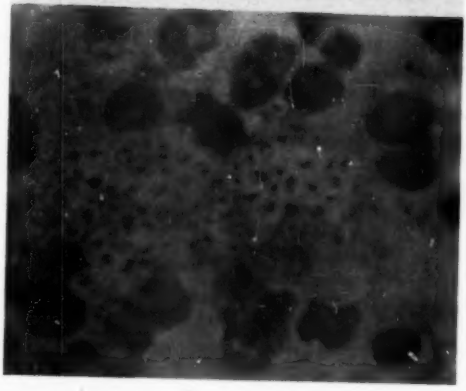

Fig. 3 — Oil immersion photomicrograph of Histoplasma capsulatum from splenic pulp.

to drawing blood using 1 cc. of 2.5% sodium citrate to 9 cc. of blood. This was placed in a sterile tube and allowed to stand for at least one month before discarding. If positive for Histoplasma capsulatum, a white mycelial growth has covered the top of the blood. (Note: In order to prove the mycelial growth is that of Histoplasma capsulatum the hyphae should be studied for the development of piriform conidia and this should be done with care. We prefer wetting the mycelial phase down with normal saline in order to protect our workers. This can be done and the mycelial phase can be studied to demonstrate the large tuberculate chlamydospores found when grown at room temperature. Grossly, the mycelial cultures of Histoplasma capsulatum and Blastomyces dermatitidis are identical. Both are white at first, then buff to brown in color. The rate of growth of Histoplasma capsulatum, however, is somewhat slower. In young cultures, the small, smooth-walled, round to piriform spores of Histoplasma capsulatum may be confused with those produced in cultures of Blastomyces dermatitidis. The development of the large round to piriform, tuberculate chlamydospores in Histoplasma capsulatum, however, clearly distinguishes this fungus from any other pathogenic organism.)[16]

Since this disease resembled kala-azar in many instances, a few physicians suggested splenic puncture. Since all four infants were suffering from purpuras, that was not feasible. However, at post mortem, our best preparations came from splenic pulp smears, stained with Giemsa stain, and allowed to stain a longer period of time (60 minutes). In the last case studied, there were such large lymph nodes that we made lymph node impressions and found the yeast-like organisms. These also were stained with Giemsa stain.

Under no circumstances have we failed to culture the bone marrow, and we have made this a routine procedure for all bone marrow studies.

The next method that has been employed was to use broth media and to culture spleen particles that were removed aseptically. The spleen particles were ground to fine pulp then cultured. Positive cases revealed a mycelial growth on the broth surface.

To obtain cultures and to demonstrate the yeast-like phase of the organism, the suspected material was placed on blood agar and incubated at room temperature. On blood agar at 37° C. the growth appears as moist, scattered, dull colonies. Microscopic examination reveals these to be oval budding cells similar to those found in tissues. Frequent transfers of the yeast-like stage can be maintained. We prefer using screw-cap containers to prevent "drying out" of the media. It is well to keep a stock culture of this organism to use for comparison; however, if

this is not possible, mycology centers can aid in identifying organisms. In studying tissues the ordinary hematoxylin-eosin stain will bring out the bodies; but they can be demonstrated very well using Gram-Weigert stain.

After the first case was reported in Indiana in 1940, we have been alert and no longer regard it as a tropical disease. We have followed reports such as the skin-testing, surveyed and reported by Vanderbilt University, and later by the United States Public Health Service. Noting that our state was one of the endemic areas, we have tried to work on suitable vectors as the transmitters of this organism. We were able to obtain spleens from healthy dogs that were sacrificed in the pharmacology laboratory, and from these we have made smears and cultures. The smears were made and stained with Giemsa stain; however, we do not recommend this as the routine as many cases could be missed. Also, a large piece of spleen was cut out after searing the surface with a hot spatula. The portion removed was macerated under aseptic conditions and planted on Sabouraud's glucose agar and also in broth containing 1% peptone, 1% glucose, and 5% plasma and allowed to remain at room temperature for 4-6 weeks. This broth should also have penicillin added to the concentration, 100 units per milliliter, and streptomycin, 50-100 mgm. per milliliter.[17]

Smears were made from the spleen pulp from each of seventy dogs, these were stained with Giemsa stain and after careful microscopic examination of each smear no organisms were to be demonstrated. Also cultures were made from this spleen pulp and allowed to remain on Sabouraud's agar slants for a period of six weeks at room temperature, and no positive Histoplasma capsulatum organisms appeared. However, we feel that it would be wise to repeat the same experiment possibly to gain more information.

This check was done to find if dogs could be the natural vectors as reports have been given where dogs had been brought to autopsy and Histoplasma capsulatum was found in all tissues.[18] Vanderbilt University has reported that four litters of dogs have died of this disease. They stressed the fact that the dogs were kept in the same kennels, and therefore contamination developed in all four litters.[17]

Conclusions

In any case in which the physician may be suspicious of histoplasmosis, the technologist should try to perform the following procedures:

1. Buffy-coat smears, especially if the white counts are low.
2. Blood culture, possibly two taken, one to be kept at room temperature, the remaining one at incubator temperature for bacterial flora. These cultures are not to be discarded in less

than four weeks' time. In case mycelial growth appears, the culture should be studied very carefully before assuming this is a contaminant and discarding.

3. Good stains on bone marrow materials; allowing the Giemsa or Wright stain to remain on slides a longer period of time.

4. Citrated blood allowed to remain at room temperature for at least 4-6 weeks to demonstrate mycelial growth.

5. In case splenic puncture is resorted to, one should make both smears and culture for the organism.

6. In case of lymph node biopsy, cultures can be obtained as well as lymph node impressions made and stained with Giemsa stain.

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DETERMINATION OF THE BLOOD LEVEL OF N—[2-thiazolyl]—phenol sulfonamide (DARVISUL)—A MODIFICATION OF THE METHOD OF DETERMINING SULFONAMIDE BLOOD LEVELS*

RUTH M. CHURCH, B.S., M.T. (ASCP)

(Bratton and Marshall; Bodansky modification)

Modification:

This differs from the accepted method of doing sulfonamide determinations in the preparation of diazo reagent. Darvisul cannot be diazotized by a solution of sodium nitrite alone. The test has been adapted to the use of the Klett-Summerson photoelectric colorimeter.

Reagents:

1. 15% Trichloracetic acid.
2. Diazo reagent:
   A. Ehrlich's solution A,
   Sulfanilic Acid.....1 gm.
   Hydrochloric Acid, C. P.....15 cc.
   Distilled water to 1,000 cc.
   B. 0.1% Sodium nitrite,
   Sodium nitrite.....0.1 gm.
   Distilled water to 100 cc.
   Immediately before use dilute Solution "A" 1:1.
   Add 0.1 cc. to each 10 cc. of sodium nitrite used.
3. 0.1% Ammonium sulfamate,
   Ammonium sulfamate.....0.1 gm.
   distilled water to 100 cc.
4. 0.1% Naphthyl-ethylenediamine dihydrochloride,
   Naphthyl-ethylenediamine dihydrochloride.....0.1 gm.
   Distilled water to 100 cc.
   Keep in a brown glass bottle.

* Read before A.S.M.T. Convention, June, 1949, Roanoke, Va.

5. Standard darvisul solutions,
   A. Stock solution—0.25 mg. per cc.
      * Intravenous solution of Darvisul (Lederle) (25 gm. %) ..... 1 cc.
      Distilled water to 1,000 cc.
   B. Working standard solution—10 mg. %.
      Stock standard darvisul ..... 40 cc.
      15% trichloracetic acid ..... 20 cc.
      Distilled water ..... 40 cc.

Method: Use green filter No. 54

Unknown:

1. To 0.5 cc. of oxalated blood in a clean dry Erlenmeyer flask add exactly 15.5 cc. of distilled water. Mix well.
2. Add 4 cc. of trichloracetic acid solution, mixing well; let stand a few minutes and filter. The filtrate represents a 1:40 dilution of whole blood.
3. Place 5 cc. of the filtrate in a Klett colorimeter tube.
4. Add 0.5 cc. of the diazo reagent. Mix. Let stand for 3 minutes.
5. Add 0.5 cc. of the sulfamate solution. Mix. Let stand for 2 minutes.
6. Add 0.5 cc. of the naphthyl-ethylenediamine dihydrochloride solution. Mix thoroughly. Let stand 10 minutes.

Standard:

1. Place 5 cc. of the working standard in a Klett tube.
2. Add 0.5 cc. of the diazo reagent. Mix. Let stand for 3 minutes.
3. Add 0.5 cc. of the sulfamate solution. Mix. Let stand for 2 minutes.
4. Add 0.5 cc. of naphthyl-ethylenediamine dihydrochloride solution. Mix thoroughly. Let stand for 10 minutes.

Blank: Using the green filter adjust the zero point with a blank of distilled water in a Klett tube.

Calculation:

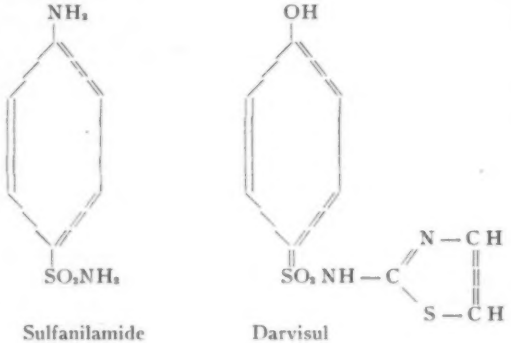
$$\frac{10}{\text{Reading of the Standard}} \times \text{Reading of the Unknown} = \text{mg. \% Darvisul.}$$

Discussion:

Darvisul or phenosulfazole is a sulfonamide which does not contain an aromatic amino group. This is a necessity and is present in the other sulfonamides if they are to be diazotized with 0.1% sodium nitrite. Darvisul does contain a phenolic group. It

* Lederle—Intravenous preparation of Darvisul contains 25 gm. %.

is known that phenols as well as aromatic amines will couple with diazonium compounds and naphthyl-ethylene-diamine-dihydrochloride to form a stable color. Here darvisul is coupled with diazotized sulfanilic acid molecule for molecule. The excess nitrous acid formed is decomposed with the ammonium sulfamate. Then the addition of the amine, naphthyl-ethylene-diamine-dihydrochloride, produces a color that is specific and quantitative for darvisul.



Sulfanilamide Darvisul

Comments:

This test does not supplant the other tests for the sulfonamides. It is applicable only to the determination of Darvisul. Darvisul was used for the treatment of poliomyelitis. Recent publications have proved its failure in the therapeutic treatment of viral diseases.

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VOCATIONAL GUIDANCE — RECRUITMENT

MRS. RUTH DRUMMOND, REGISTRAR
Registry of Medical Technologists of
American Society of Clinical Pathologists

When Miss Eichman asked me to participate in this panel discussion on Vocational Guidance, I eagerly accepted because I believe it is one of the most vital aids in the growth of Medical Technology as a profession. Vocational Guidance is beginning at the beginning, it is the first chapter in the book. Here the plot is laid, and here we introduce the characters—you people and any bright young science students are the main characters; the plot is a carefully laid plan to bring these students to a full knowledge of what medical technology is. This panel discussion might be considered simply an expansion of some of the ideas Doctor Montgomery set forth at the convention at St. Paul, in his talk entitled "The Responsibilities of the Medical Technologist." We hope to give you an over-all picture of what *has* been done, what *should* be done, and what *can* be done to fulfill these responsibilities.

There are *several reasons why vocational guidance is greatly needed.* I cannot list these in the order of their importance, because they are almost equal. There is need to disseminate vocational information about medical technology because there are several ways a medical laboratory worker can be trained, all but one of which are undesirable. The following are the unacceptable, undesirable ways: 1) She can be "trained" in a commercial school. 2) Some colleges offer what they consider technical training, even though they are not affiliated with any hospital and of course have no pathologist on the staff. 3) Some hospitals train students in laboratory work, though no pathologist supervises the training. 4) Some physicians train their own girls to do certain tests. 5) Some medical technologists (not registered, of course!) train students. 6) And then there is the way we who are associated with the Registry of Medical Technologists of the American Society of Clinical Pathologists *consider the one and only way to train students adequately and properly, and that is in Schools of Medical Technology approved by the Council on Medical Education and Hospitals of the American Medical Association.*

One of the most basic and obvious reasons for the great need for vocational guidance in this field is the fact that there is a new crop of young people coming on every year. This means that vocational guidance must be a continuous thing; it cannot be done one year and then dropped. It must be done all the time and year after year. There may come a time when it will be so well known a profession that youngsters will play at medical technology as little girls now play at nursing or school

teaching, and boys play at being doctors or aviators, but that will be only if we do a good job, and it may not be in our time! So vocational guidance is a thing we must include in our programs every year, and it is something we must have in mind every day.

When we think of vocational guidance we are apt to think only of the young people in whom we want to create an interest. But I believe we should think also of others whom we must educate and inform. For instance, we need to get our information about what we consider proper training to hospital superintendents, and to physicians. If you think you have sufficiently educated all of the physicians in your area, just remember that there are new ones coming on all the time, and we suggest that you can start your educational program with the internes in your hospital, or with the medical students, if you happen to be associated with a medical school.

Another reason for vocational guidance programs is that the Registry and its standards and requirements are not held in too high regard by some individuals and some groups. This may be partly due to a lack of knowledge of these requirements, and deeper than that, to a lack of knowledge of the fundamental reasons for these requirements. The opinions of people who are thus negative toward our standards no doubt have a great influence on many young people, and thus may be causing us to lose good material. Such counselling may be worse than none at all.

Then of course there are some groups that are making great efforts to dominate the field, though their educational and professional standards are not what we consider adequate. It would seem that the best means of combatting this sort of thing is an educational program which would include vocational guidance.

Another reason for the need for vocational guidance is that the field is growing, and more well trained workers are needed as it grows. We can, therefore, say that we need to concentrate more on actual recruitment for this profession, as well as to simply pass out information about it. For purposes of comparison, we might call vocational guidance the passive approach, and recruitment the dynamic approach. Certainly they go hand in hand, but I cannot stress too strongly the fact that we must do *both*. Surely there are a sufficient number of advantages to be gained by working in this field, a sufficient amount of satisfaction, to warrant going out after likely recruits, and if you do not take a positive approach, the profession may lose prospects who would have done credit to you and your fellow-workers. Along this same line of thought, it should be pointed out that this is essentially a woman's field (94.6 per cent of our registrants are

women), and therefore there is constant replacement necessary, as these women leave the profession to retire to private lives.

Whose Responsibility is it?

It is the responsibility of each registered medical technologist. Each local and state group, as well as the national group, has its responsibilities in this direction. The Board of Registry, the American Society of Clinical Pathologists and its individual members, state groups and other pathologists, all have their responsibilities toward disseminating vocational guidance material and recruiting for this profession.

What the Registry has done and continues to do year after year.

For many years, because it had to be done and there was at first no one else to do it, the Board of Registry has taken the initiative in publicizing medical technology as a vocation, and in the larger sense this is vocational guidance. Please bear in mind that the Board of Registry is a qualifying body, and actually that is its only official capacity. Whatever else it has done besides passing on the qualifications of persons interested in certification as medical technologists, have been activities outside its sphere as a qualifying body. It is not that the Board has not wanted to do these things, nor that it has not enjoyed doing them, but the profession was so new, the Board was so eager to give it a good start, that from the beginning it felt a responsibility toward assuming many of the activities that are now rightly being assumed by the American Society of Medical Technologists. I would like to take a few moments to tell you some of these things that are done by the Registry office. Doctor Montgomery will give you specific figures on the amount of material sent out from the Registry office last year, so I will not do more than mention that this entails much time and we think that it pays off well in the long run.

Each issue of the American Journal of Clinical Pathology and the American Journal of Medical Technology carries an advertisement of the Registry; frequently they are about guidance.

Articles are written about medical technology for publications such as the hospital journals, "Bios" magazine (a magazine read by college science students), "Trends" (put out by Science Research Associates). Just a few weeks ago Miss Feucht sent us a letter she had received from the Managing Editor of this last named organization, enlisting help in preparing a monograph on medical technology. We gave the editor much informational material and statistics on every phase of the problem we thought pertinent. We hope that as a result the monograph will contain authoritative current data which will be helpful to guidance directors, and through them, to students

interested in this field. Writers for various other magazines write to us for material, and usually (at our request) send their copy to us for suggestions and criticisms. Sometimes they do not, but we wish they had, so we could have caught some error. Some of these who have conferred with us recently are "Madamoiselle," "Glamour," "Seventeen," and about five years ago an article about medical technology was written for Coronet at the suggestion of the Board of Registry. We are now at work on an article we have been asked to prepare for "Hygeia," one of a series of articles about auxiliary medical vocations. Feature writers for newspapers frequently come to us for assistance and materials. We do about the same thing for persons who are preparing radio talks. When we hear of a mis-statement being made in an article, we write to the editor and set him straight. A recent incident of this sort occurred not long ago, when Miss Matthaei told us about an article in the December "Woman's Home Companion," which contained what she thought was some pretty wrong information. We thought so too, and we wrote to the Editor and the author. They carried a correction in a subsequent issue. Of course there is always the danger that the persons reading the original article may not see the correction; on the other hand, some one may not have read the original article, but because the correction carried the Registry name and address, they at least know where to write for authentic information.

Many college deans or heads of science departments ask us to go over their pre-medical technology curriculum and give them suggestions as to its adequacy. Also, we often notice in the college catalogs or on transcripts, discrepancies between what is offered to these students and what should be available to them. In these cases we take it upon ourselves to write to the proper person, suggesting courses we think would more nearly meet the prerequisites. Of course, we receive thousands of letters from individual students asking for advice about requirements in general, or for specific advice about courses they should take and whether these courses are acceptable. We have given much advice to Veterans Administration Counselors who are guiding veterans' pre-technical programs, and we also see that they have proper information regarding where to get their technical training. It goes without saying that we are ready at all times to help any young people referred to us by any of you.

We have written to all State Departments of Education, asking if they had facilities to include our High School booklet with other vocational material they send to high schools. About half of them were able to do this. Not long ago, through a request to Mrs. Wallace, we had the opportunity to send material to the U. S. Office of Education in Washington, to be sent to State

Departments of Education. Registry pamphlets are listed in various source books such as Occupational Index, Educators Progress Service, and Science Research Associates, mentioned previously. These lists go to vocational guidance counselors in high schools, colleges and universities.

Of course we send out vast amounts of material for use at career conferences, and give suggestions for talks at such conferences. The number of these requests has increased so much that we are preparing a kit of such materials, and an accompanying list of suggestions for conference leaders. These kits will be ready for your use in a short time.

We have sent letters and materials to all hospital superintendents, pointing out the value of having registered medical technologists in their laboratories. For several years Doctor Montgomery has lectured to the class in the Hospital Administration course at Northwestern University, and that has been an excellent way to educate new hospital administrators about medical technology. He gives them booklets and approved school lists, and they even have to take an examination based on this material.

The Registry exhibit is available to anyone who can make space for it at medical meetings, medical technologist meetings, vocational conferences. It is regularly used at AMA meetings, ASCP meetings, Southern Medical Association meetings, your own meetings, often at the American Hospital Association convention, and at your state and local meetings.

What you can do, as individuals and as groups.

Now what can *you* do, as groups and as individuals? Of course, many of the things previously mentioned have included you, but perhaps there are other things you can do or are doing. For one thing, you can mention this vocation and the need for proper training, on every possible occasion. One well known pathologist says that he tries to tell someone about medical technology every week. Certainly you will want to make some reference to the need for vocational guidance at every local, state, and national meeting. You can (and many of you do) work with various civic groups in conducting career conferences. You can work with local and state societies of pathologists in a program planned to disseminate proper information about the profession of medical technology. If you hear of a career conference and medical technology is not represented, get yourself a place on the program. Cover your state and let colleges and universities know that you have members willing to participate in their career conferences; most of them will be grateful for your assistance, and some of them may never before have considered having a representative for this profession. Don't do this one

year and just expect to be asked back the next year; they may have a new set of teachers and students planning the conference next year, who may not necessarily be aware of the need for including medical technology. Offer a counselling service to students in the high schools and colleges who need help in planning courses in preparation for further training in this field. See that there is adequate material on your vocation in your local library, and suggest to the librarian that she have an exhibit of guidance materials on medical technology during the week of the career conference. And may I mention here that while we are great believers in each registered medical technologist recognizing and assuming her individual responsibility, the most productive work will be that done as local, state and national groups. You, yourselves, have proven that these last few years. Could you have accomplished as individuals the outstanding things you have accomplished as the American Society of Medical Technologists, with all your affiliated groups cooperating?

Invite high school and college students interested in science to visit your hospital laboratory, so that they can see what goes on and what the work of a medical technologist is. Don't just show them the laboratory, tell them in terms they can understand, what is being done there.

Girl Scouts, Girl Reserves, 4-H Clubs, often have a series of vocational talks, and even though they have never asked you to participate, confer with their leaders early in the fall when they are planning their year's programs, and suggest that you would like to talk to the girls about your profession. Does your local medical society have a meeting where an educational exhibit about this vocation can be shown? Some localities have "Health Fairs," where they attempt to give the general public an idea of what medical services are available to them. State Fairs offer space for educational exhibits of various kinds; Miss Lehman is planning such an exhibit for the Indiana State Fair this fall.

The radio is a fine medium for disseminating vocational and educational information. Have spot announcements at the time of your local and state meetings. Maybe there is a college or university station in your town; they usually are glad to arrange for a talk on this profession at some time during the year, or perhaps an informal discussion would fit their particular plans best. Sometimes the County Home Demonstration Agent has a daily or weekly program; she is usually eager to have programs that are different, and yours can be different.

Have a feature story in your newspaper at the time of local and state meetings. Even though your state meetings may not be in your city, some of your local medical technologists are going, and that could be used as the basis for a story which

could give more than just the actual information about the meeting itself. Perhaps one of your home-town boys or girls is leaving to enter one of the Approved Schools of Medical Technology; see that there is an item about it in the paper, and add a bit about how this school prepares young people for medical laboratory work, and perhaps mention how many such schools there are in the state, and how many throughout the nation. Or perhaps a local boy or girl has just completed the training; the home folks will be interested to hear about it, and you may in this way interest some other young people in going into this work. Has a new Approved School of Medical Technology recently been established at your hospital? Here is a fine opportunity to have a really good story about the advantages offered there, with perhaps a picture of the pathologist and the medical laboratory staff. An Approved School of Medical Technology was recently established in the Canal Zone and there was quite a lengthy article in their local paper about it, going rather into detail about who approved it, who directs the training, and mentioning the fact that students completing the course would then be eligible for certification by the Registry. Does your newspaper ever have special stories or pictures in the Sunday edition, about the various kinds of work in your community, or about the health services available? Even if no such feature is a regular part of the paper, couldn't you suggest it, and work with them on it? Don't miss this kind of a chance to tell your neighbors about what your profession contributes to the welfare of the community. News stories such as these may be the one thing that will turn some young person into the path leading to the right kind of training in this field; he may have seen only the glowing advertisements about the commercial schools, and have the idea that they were the answer to his dreams about getting into medical laboratory work.

As a further means of interesting young people in medical technology, have you thought of establishing a scholarship for some worthy young person who has all the mental and personal qualifications necessary for success in this work, but who cannot afford the training? Perhaps you can interest some civic group in such a project.

Some Do's and Dont's for Career Conferences.

And now some "do's and don'ts" for your career conferences. Do select as speakers, people who talk easily and interestingly. Do keep your talk on a level that will appeal to the age group which you are addressing. Do have current and authoritative information, and put in some graphic illustrations of what the work encompasses. Do be realistic and objective. Do leave time for student participation and questions.

Don't give a lot of dreary, detailed facts and figures. Don't glamorize or oversell your vocation. Don't obviously try to recruit. Don't discourage consideration of the field by making it seem too exacting, too difficult.

What have you done?

Below are accounts of work done in recruitment programs in some of the local and state societies.

RECRUITMENT OF MEDICAL TECHNOLOGISTS

Methods Suggested by Vocational Guidance Committee of A.S.M.T.

RUTH FEUCHT, *Chairman*

During the last eight years we have all faced the shortage of well-trained laboratory workers. The search for a solution to this problem always leads back eventually to the fundamental fact that more young women must be interested in medical technology as a profession and that they be impressed with the importance of being trained in a registered school.

To meet this need, the Chicago Society has undertaken a vocational guidance program with some measure of success. We have at least a definite indication that interest can be aroused and we are confident that the day can come when all laboratory technicians will be registered, assisted in their work by lesser qualified aids or attendants who will have positions of limited responsibility and correspondingly lower renumeration. We find this cooperative effort stimulating interest in our society. Those who cannot assist in the more formal meetings with student groups and counselors have ample opportunity to pass along registry information in their daily contacts.

The mechanics of gaining more applicants for our registered schools has divided our efforts into two main channels. First, we have reached high school and college girls with our registry information and secondly, we have publicized our profession to the public.

To set up our vocational guidance program in Chicago, a chairman was appointed and the city and suburbs divided into five districts with a captain for each area. The captain tried to contact a vocational guidance counselor or some interested science teacher in each high school and college in her district. They offered to supply these teachers with literature from the registry, to fill their requests for career day speakers on medical technology and to have personal conferences with the counselors.

Each member who volunteered to take a speaking appointment in a high school was supplied with a suggested outline for a talk to the students and a Clinitest Kit to give a demonstration

of a simple laboratory test. Blood typing sets were also used by some of the speakers.

There was quite a good response in requests for literature and also for technologists to speak in assembly periods in Career Day programs.

This year we changed the approach a little trying to concentrate more on informing the counselors as they advise all the students from year to year.

To accomplish this objective we planned a tea in a hospital of each district and invited teachers from each school in the respective districts to attend. At the tea we supplied literature, pointed out the requirements for a recognized school and the advantages of attending such a school.

While the attendance of the teachers was not 100% the interest shown by those who did come was very gratifying. We benefited equally by the suggestions they made to us for furthering our program.

Following the lead of Colorado and some of the other states, we tried having an Open House for high school students in the laboratory of one of our smaller hospitals. The senior girls who we interested from the nearest high school and their counselor attended. Some laboratory tests were demonstrated for the guests and a tour of the hospital was made including the diet kitchen and a little talk from the department of nursing education. Tea was served in the dining room. We were well rewarded both by good attendance and much interest shown by those who were present. Next year we hope to have a number of these Open House programs scattered throughout the city.

These are some of the methods we have used to pass on registry information to school girls. Through this organized program we are sure we have reached many more girls with correct information than could possibly have been contacted with a more haphazard, well meaning, but not too effective, individual approach.

I shall now move on to the second broad part of our undertaking, publicity of our profession to the general public. Since medical technology is a relatively young profession and the general public is unfamiliar with it, we felt anything we could do to acquaint people with the profession is certainly advantageous. In our program to reach the general public we have obtained some newspaper publicity through sending members to speak on medical technology at the Career Conference sponsored by The Chicago Sun-Times newspaper. This was a three day conference held during the Christmas holidays.

In addition to this the Chicago Sun-Times has given more publicity to medical technology in its Career Column where it featured the profession this past winter in a short article on

information obtained from Mrs. Drummond when she was in Chicago attending the pathologists convention last fall.

The Career editor has called one of our members whenever she has questions from readers that she needs more information to answer and has referred interested parties directly to her.

Then too, our chairman wrote the State Supervisor for Occupational Information and Guidance, State Department of Education supplying him with literature from the registry and asked him for any suggestions he might have. He wrote back and requested a brief statement about medical technology which he would include with material sent out to all vocational counselors in the state of Illinois. This we felt was a very fine opportunity.

Also for several years our organization has been one of a group of organizations known as the Women's Share in Public Service whose purpose is to put women in public office. We had about 12 members present at their annual meeting and prepared an exhibit showing some of the work done and equipment used by a medical technologist.

Our entire effort as you can see has been first of all to make every technician in the Chicago area registry conscious and to make her feel a responsibility to encourage other young women to enter the profession with adequate training. This is the only way we know of to combat the short-of-help situation which has been such a headache in all laboratories.

It is not enough to be proud of our profession. We must help keep the requirements and standards of the work high by going out and selling the registered school to as many young women as possible.

VOCATIONAL GUIDANCE AND RECRUITMENT IN OKLAHOMA

DOROTHY FOREMAN

In past years our chief concern has been the establishment of the standards of the Registry of Medical Technologists. We have watched with pride and satisfaction the increasing demand for Registered Medical Technologists and the recognition of our profession by the medical profession and the public, as well. We now realize we must do more than watch our progress. We must recruit students for medical technology in order to maintain the standards that have been established and to supply the demand for qualified medical technologists.

The need for such program may be emphasized by a report on the approved schools for medical technologists in Oklahoma. In 1943, our training schools were approved to train 24 medical

technologists, but only 12 completed the course. The following year, the maximum number was 26 and 12 received training. In 1945, we could have trained 26 and 14 were trained. We could have augmented our number by 32 in 1946, but 14 medical technologists completed training. The approved number for 1947 was 32 and the actual enrollment was 17. Last year the total capacity of the schools in our state was 50 and the total enrollment was 20. For the six year period considered the total number of medical technologists trained in Oklahoma could have been 190 while only 89 were trained. On a National scale, the maximum enrollment of all the approved schools for medical technologists was almost 2,800, but the total completing training was 1,499. To condense the figures, our schools are producing about 50% of their capacity.

In Oklahoma, the need for a Vocational Guidance and Student Recruitment program has long been recognized and developed. Members of the Oklahoma Society of Medical Technologists have met with high school and college groups to explain the requirements and supply information about the profession. In 1948, a state-wide campaign to reach all high school seniors and science students in the colleges and universities was inaugurated. A poster entitled "Be a Medical Technologist" along with a letter explaining the purpose of the program was mailed to all the high schools and pre-technology colleges and universities in the state. The poster consisted of a picture of an attractive medical technologist seated at a microscope surrounded by hematology equipment. Above the picture were the words "Be a Medical Technologist." Under the picture the following information appeared: For a profession of scientific interest and humanitarian service, train for medical technology, as approved by the Registry of Medical Technologists of the American Society of Clinical Pathologists. Opportunities are unlimited and positions are available in Research Laboratories, Hospitals, Clinics, Government institutions, Doctor's Offices, and Industries. Information concerning educational requirements and approved schools in Oklahoma may be secured by writing Miss Mary K. Garrett, M. T. (ASCP), Public Relations Chairman, Oklahoma Society of Medical Technologists, 426 N. 6th. Muskogee, Oklahoma or Registry of Medical Technologists, Ball Memorial Hospital, Muncie, Indiana.

Over 450 posters were mailed. The cost of the entire project was approximately eighty dollars. Miss Garrett compiled information on the pre-technology and approved schools as to entrance requirements, length of training period, materials furnished, date students were accepted and college affiliation. It was of interest to learn that several of the colleges in the state would give credit for the training for medical technology toward

a degree, thereby making it possible for a student to complete the requirements for a Bachelor Degree and be eligible for registration in four years.

The immediate results of the project were gratifying. A number of letters were received requesting information, particularly from high school students. We hope the future gives more evidence of success in recruitment by more students in medical technology.

Another contact with pre-technology students is through the "Career Conference" held for high school and college students by the University of Oklahoma each year. The conference is financed by the Student Senate and a committee of students is selected to administer the conference. It is slanted toward freshman and sophomore students in the university who have not selected their major field of interest. Also, honor students from high schools in Oklahoma are in attendance. Approximately, thirty vocational fields, ranging from "Marriage" to "Big Business" are decided upon and outstanding men and women are secured for speakers in their particular field. Each speaker is scheduled for an hour's talk including time for questions and answers. Private conferences are scheduled with the speaker for individual counseling. The formal talks cover the requirements for entering the field and general information concerning the profession. The individual conferences, quoting Miss Vernal Johnson, who represented our profession this year, cover very nearly everything, believe me! Last year we were represented by Mrs. Lucille Wallace, then president of the ASMT. Next year the plans are to use speakers for a general talk about the occupational opportunities in a given profession and then to use the speakers for more specific talks in classroom situations. We are looking forward to the "Career Conference" of 1950 and hope to be included in the professions selected.

In the field of Vocational Guidance and Recruitment for medical technology we must not overlook the work being done by the honor societies of medical technology in the colleges and universities. These organizations should be encouraged as their fundamental purpose is to stimulate interest in the profession among pre-technology students.

As to plans for the future, we recognize the importance of contacting students of high school level and the idea of "Career Conferences" may be carried to high schools all over the state, with medical technologists in the areas serving as speakers. Another plan is to include in the talks Blood Grouping Tests of the students to illustrate a phase of our work. Each student is to be supplied with a card giving his blood type and Rh factor, compliments of the Oklahoma Society of Medical Technologists. We hope to present medical technology as a possible

choice of profession to all high school boys and girls in Oklahoma.

To stress the need for a program as we have been discussing and to point out that our efforts to date have been recognized, I would like to quote portions of an article on "Technical Personnel" which appeared in the May 7, 1949 issue of the Journal of the American Medical Association." The technical schools approved by the Council on Medical Education and Hospitals continued to expand, particularly in the fields of medical technology and x-ray technic. . . . The existing schools, even at their present stage of development, are not able, however, to supply the full needs of the expanding hospital field as well as the growing demand for technical personnel in doctor's offices, clinics, medical centers, health laboratories, governmental services, research laboratories and other beckoning fields. The student recruitment program must be further intensified with increased counseling at high school and college levels. Existing courses should be expanded to their full capacity, and additional schools should be developed in other hospitals, colleges and universities that are able to supply the necessary facilities and teaching personnel. Further attention should also be given to the establishment of preparatory courses in colleges and universities with the channeling of personnel into affiliated schools. Whenever possible, credit for time should be extended so that the period of practical hospital experience might be utilized in fulfilling the requirements for a degree. The growing interest in technical training and the continued cooperation of schools and allied organizations give every indication that well qualified technical personnel will be available in increasing numbers to meet the expanding needs of the medical and hospital fields."

RECRUITMENT OF MEDICAL TECHNOLOGISTS THROUGH COOPERATION WITH LAY ORGANIZATIONS

ROSE MATTHAEI, M.T. (ASCP), *Houston, Texas*

During the past two years our most effective efforts toward recruitment of medical technologists has been through cooperation with other organizations. The first program along this line was a Panel Discussion before the Business and Professional Women's Club of Houston. This was designed to distinguish between the professions of nursing and medical technology. The speakers represented different types of work in each of the two professions.

This Panel resulted in a series of Career Clinics for the high

school girls of Houston. Needless to say, medical technology was the subject highlighted in the clinic on Careers in Medicine. As a result of this publicity, a number of contacts were made with prospective medical technologists there and in the local colleges. Annual parties have been held for them in the Nurses' Home of one of the local hospitals. At these they hear talks by technologists representing the different types of work they can enter by way of advanced study. In our circles any mention of the "Laboratory Aide" is decidedly taboo. As an introduction, we have a student technologist make a short talk, and this is followed by accounts of the work in a large hospital laboratory, a clinic, a doctor's office, and a medical department laboratory in an industry. The program may use any variation of the above that is convenient just so long as the subjects are somewhat representative. We try then to follow the progress of some of these prospects, and to let them know of our continued interest in them.

We have also been trying to work out some means of having them in a laboratory for a short time during the summer vacation in order to get a taste of the real thing, but thus far we have not crystallized any of these plans.

We have also participated in Panel Discussions before the Houston branch of the National Vocational Guidance Association. This has resulted in having the Harris County Society of Medical Technologists invited to belong to the Occupational Planning Committee of Houston. This latter organization is composed only of member organizations, each of which is represented by two persons. We also have individual representatives who belong to the NVGA. Membership in these groups has resulted in much wider recognition of medical technology, as well as having given us several opportunities to place before the public such material as we have on the subject. This has been one of our handicaps—we do lack written matter about our profession. The Board of Registry has been our source of supply, and we have used the lists of "Approved Schools," Bulletins, and the pamphlets on Medical Technology as a profession. These have been given to such vocational guidance groups as Bnai Brith Vocational Guidance Service, and have been used in a display of such material in the Public Library.

The State Department of Rehabilitation has requested information on Medical Technology, and was especially interested in acquiring a list of schools for colored students. The State Employment Service has requested material, as have the Placement Services in the local university. The Director of Vocational Counseling in the University of Houston has been most cooperative with us.

The Federated Past Presidents' Club of Houston has shown

much interest in the possibilities of Medical Technology as a career for young girls, and members of our local society have been asked to speak before them at some date this coming September. One of the local chapters of a national service club for women has mentioned the possibility of a scholarship for a prospective medical technologist also.

As a project of the Texas Society of Medical Technologists, a committee composed of several of our local members was instrumental in carrying out a statewide program of recruitment. We followed the example of the Oklahoma Society, but had our own posters made. These posters, together with a brief letter of explanation, were mailed to some fifteen hundred four-year high school principals and to the heads of the science departments of every college and university in the state. There has been a splendid response to these letters, and each has had a prompt personal reply. Here again, we have had to call upon the Registry for the informational bulletins.

We feel that medical technologists can do a great deal toward publicizing our profession through belonging to service clubs. Contacts thus made will go a long way in locating possible technologists. Parent-Teachers' Associations are an almost untouched source of recruitment assistance. Here is where some of our "retired" technologists may be of help to us. Those who have children of their own should be approached and their assistance solicited.

Finally, it is up to each of us to make the Registry Bulletin and a list of "Approved Schools" as much a part of our own laboratory equipment as the microscope and colorimeter, and never to miss an opportunity to talk medical technology or to explain medical technology to even the most unlikely prospect. Either directly or indirectly these conversations may bring just one more medical technologist into the "fold" and give us that long-hoped-for chance to work under just a little less pressure.

AMONG THE NEW BOOKS

DISEASES OF THE HEART: By Charles K. Friedberg, M.D., Associate Physician Mt. Sinai Hospital, New York; lecturer in Medicine, Columbia University. 1081 pages with 79 figures. Philadelphia and London: W. B. Saunders Company, 1949. Price $11.50.

This book is a treatise for medical students and practitioners. Very little is given on the technology of electrocardiography. Nevertheless, the volume is timely and comprehensive.

In the opinion of the reviewer, hospitals training internes, residents, and nurses will give this timely new volume a most welcomed edition.

AN ATLAS OF THE BLOOD AND BONE MARROW: By R. Phillip Custer, M.D., Director, Laboratories of the Presbyterian Hospital, Philadelphia; Assistant Professor of Pathology, The University of Pennsylvania School of Medicine; Consultant to the Armed Forces Institute of Pathology. 321 pages with 285 figures, 42 in color. Philadelphia and London: W. B. Saunders Company, 1949. Price $15.00.

Dr. Custer's Atlas is **the** contribution to hematology for 1949 among the books which have appeared on this subject.

The book is designed to give clinicans, clinical hematologists, pathologists, and medical technologists a clearer understanding of the normal and pathological physiology of blood formation and destruction that will aid in establishing accuracy in diagnosis.

Seldom does one find a book so beautifully illustrated and at the same time written clearly, concisely, interestingly, and precise to the point of finesse. Many new and original tables are found throughout the text.

Blood disorders are classified from the point of pathologic physiology—which in the opinion of the reviewer is the practical common sense method for such classifications.

For those individuals doing sternal marrow counts and those engaged in hematological diagnosis this book is a **must.** It is exquisitely written and illustrated.

FORENSIC SCIENCE AND LABORATORY TECHNICS: By Ralph F. Turner, Associate Professor, Department of Police Administration, Michigan State College, East Lansing, Mich.; Formerly Laboratory Supervisor, Police Department, Kansas City, Mo. 267 pages and 109 illustrations. Springfield: Charles C. Thomas, Publisher, 1949. Price $6.50.

This useful manual of forensic science will undoubtedly be well received where it is needed as a practical guide for those interested in this subject. Hospital laboratories should have the volume for a reference if there is any likelihood that such a laboratory might be called into consultation by the local police—especially in a small city where such facilities are not provided for by the local police departments. The laboratory procedures given are well presented and particularly interesting.

NORMAL VALUES IN CLINICAL MEDICINE: By F. William Sunderman, M.D., Ph.D., Professor of Experimental Medicine and Clinical Pathology, University of Texas Postgraduate School of Medicine; and Frederick Boerner, V.M.D., Late Associate Professor of Clinical Bacteriology, Graduate School of Medicine, University of Pennsylvania. 845 pages with 237 figures and 413 tables. Philadelphia and London.

This is a clinician's book—yet there is so much of practical value to the medical technologist, that one feels that this is another book which should become a part of every laboratory. The contents are briefly: Circulatory System, Blood cellular elements, Chemical Components and Physical properties of the Blood, Respiratory System, Digestive System, The Nervous System, The Urinary System, Male Genitalia, Female Genitalia and Reproduction, Skeleton and Skeletal Muscles, The Skin and Its Appendages, The Eye, The Ear, The Nose, Endocrines, Metabolism and Nutrition, Anatomical Normals, Teeth and Saliva, Miscellaneous Data, Appendix and Index.

When one considers that a technician has what may be called a repertoire of tests at her command, this book serves one very useful purpose—what then—should be in this technical repertoire? How many tests can a technician offer? How many more should she offer than she has at her present command? It seems safe to predict that this new volume will have a definite influence on panels of tests, what is to be done, and to a certain extent—what methodology.

To those of us who were privileged to know Dr. Boerner personally, this book is a welcome contribution in that it gives us his last great contribution to medical science—namely—what is the normal range. His great devotion to medical science will live for many years with those of us who knew him as a very busy man, but never too busy to help even a beginning student with the slightest trivia.

Thus in passing here is book of yesterday leading us into the technology of tomorrow and its greater responsibilities.

ABSTRACTS

THE DIAGNOSTIC SIGNIFICANCE OF "BURR" RED BLOOD CELLS: By Steven O. Schwartz, M.D., and Salvatore A. Motto, M.D. (From the Hematology Laboratory of the Hektoen Institute for Medical Research of the Cook County Hospital, Chicago, Ill. Amer. Jour. Med. Sci. 218: 563 (Nov.) 1949.

These authors noted that while routinely reviewing blood films, the occurrence of a peculiar red blood cell measuring about 7.5 micra or less in diameter and having one or more large spiny projections along its periphery in some cases of uremia, carcinoma of the stomach, and in some bleeding ulcers (peptic). These "burr" cells are very rare in normal blood. The authors did wet preparations and found these cells to be preformed poikilocytes.

NEVER TRANSFUSE A WOMAN WITH HER HUSBAND'S BLOOD: By Bruce Chown, M.D., **61:** 419, (Oct.) 1949. Canadian Med. Jour.

The following case history is presented as evidence for the maxim: "NEVER TRANSFUSE A WOMAN WITH HER HUSBAND'S BLOOD."

Wife and husband both type O, Rh positive
2 children both normal. Type O, Rh positive.

The mother received a transfusion from her husband and from one other Rh positive donor. In 1946 a male macerated fetus was born at 5 months; and in 1948 a male baby with erythroblastosis of the general oedema type was born. Microscopic studies confirmed this diagnosis in that the baby's cells gave a strong Coomb's reaction, and also, the mother's serum contained an antibody that agglutinated the red blood cells of both the husband and the baby.

This editorial is presented as a warning—not a contribution to technology.

Note: The Journal of the American Medical Association has called attention to the article in its editorial pages.

SUMMARY OF THE WASHINGTON UNIVERSITY SCHOOL OF MEDICINE POST-GRADUATE COURSE FOR MEDICAL TECHNICIANS.

It was the good fortune of your Book Review and Abstract Editor to attend these seminars. Dr. Gustave J. Dammin conducted round table discussions after each paper had been presented, and he saw to it that pertinent, timely questions were asked and answered.

Dr. Frank R. Bradley, Director of Barnes Hospital, extended a real welcome to the 50 technologists who were enrolled for the course. His appeal for a technologist assuming an artist's attitude in her profession was timely and the manner in which his appeal was made, most inspiring.

The following program was presented: (each paper was either a 30- or 45 minute presentation and/or discussion).

"Current Trends in Medical Technology"—Dr. Gustave J. Dammin—Excellent survey of field.

"Newer Nomenclature in Hematology."—Dr. Carl V. Moore—Thinks terminology for Leukocytes by Committee will be accepted—doubts if terminology for erythrocytic series will be.

"Reticulocyte and Platelet Counts."—Miss Virginia Minnich—Modified Dameshek technic presented.

"Methods for Study of the Bone Marrow."—Dr. Edward H. Reinhard—Technics used at Barnes Hospital presented.

"Methods in Diagnosis of the Hemolytic Anemias."—Dr. Philip Loge—Panel of useful tests presented.

"Choice and Use of Liver Function Tests."—Dr. Robert Shank—Excellent Summary.

"Methods for Determination of Lipids, Urobilinogen," etc.—Miss Kathleen Roetta—Technics outlined; pitfalls indicated.

"Methods for Prothrombin, Van den Bergh," etc.—Miss Mildred Oswald—Technics given.

"Tests for Renal Function."—Dr. Dean Davies—Purpose of tests and technics briefly given.

"Principles of Tissue Fixation and Staining.—Dr. Albert I. Lansing.

"Responsibilities of the Technician in Surgical Pathology."—Dr. Lauren V. Ackerman—Interested technologist invaluable to pathologist in this branch of technology.

"Routine and Special Methods."—Miss Shon Lockhart—Histology methods.

"Methods in Exfoliative Cytology."Mrs. Elizabeth Jackson. (Did not hear).

"Principles of Electrocardiography."—Dr. Bernard Lipman—Excellent summary.

"The Basal Metabolism."—Miss Elibeth Houghton—Par excellent discussion of the problems which one meets and how to solve them.

"Bacteriologic Methods."—Dr. Carl Harford—A "what to do" and "how to do" discussion.

"Serologic Methods."—Mrs. Angelyn Riffenbergh—Special attention to antigens was given in this paper.

"Blood Bank Methods."—Miss Marie Baugh—Practical discussion.

"Determination of Proteins and Phosphatese—Microchemical Methods."—Dr. Oliver Lowry. (Technics presented suitable for survey work.)

"Principles of Spectrophotometry."—Dr. Theodore Weichselbaum. Practical everyday approach to a highly theoretical subject. Presentation excellent.

"Methods in Clinical Parasitology."—Dr. Hitomu Tsuchiya—A how, when, and what to do. Timely illustrative demonstrations pertinent to the material presented were set up.

When the seminar was over, those of us who attended were impressed particularly with the sympathetic attitude of Dr. Dammin toward the problems of medical technologists. To Washington University we feel that no effort was spared in making this period of post-graduate study worth the time and money invested by those who were present for this excellent refresher. To Dr. Frank R. Bradley of Barnes Hospital, we are most grateful for his appreciation of the role that we, the medical technologists play in the over-all practice of medicine.

In 1950 a similar course is expected to be given with a not so limited enrollment.

Comment: This is but an example of what medical centers can do for medical technology.

C. B.

EDITORIAL

WHY HAVE A CONSTITUTION AND BY-LAWS*

The first seven Articles of Incorporation are unchanging. They represent the agreement made with the Department of Corporations of the state of Michigan, and thereby make the AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS an organization with legal status. As a matter of general interest, we doubt if more than 10% of our members have read that portion of the document which has at one time or another been received by each one of us.

For that matter, how many of us have read any more of the paper that tells why and what we are? Just for a bit of interest in your organization some day, try picking up your copy of the ARTICLES OF INCORPORATION AND BY-LAWS OF THE AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS. Even Constitutions can be fun—if you're interested. What sort of people belong to A.S.M.T.? Not "just anybody," by any means. Had you ever read Article VIII on MEMBERSHIP? We're rather an exclusive group. Had you ever stopped to think that even the doctor by whom you are employed may not be eligible for membership, not if he doesn't hold a certificate from the Registry of Medical Technologists (ASCP), not if he hasn't had at least a year of experience in an acceptable laboratory in one of the branches of Medical Technology. His degree, you ask, doesn't that make him eligible? Not the degree alone, even if it is above the Master's level, can help him to join our organization if he hasn't actually labored in a laboratory as one of us. Not just any Ph.D. can belong—unless he qualifies also as one who has actually worked in that same laboratory. And isn't it well that we can define our affiliate members, also. That gives us a new group whom we can encourage to study further and qualify as full-fledged Medical Technologists.

And Honorary Members—do we have any, you ask. Not A.S.M.T., but do you know of someone in the field of laboratory medicine in your state who has done something outstanding in that work? Do you have an Honorary Member of your state society who would qualify? Present that person's name to the Board of Directors—but be sure his work has been a genuine contribution to Medical Technology. We want to be proud of all our membership. We ourselves have defined that membership status in our own House of Delegates meetings. We have also defined many other points in the Constitution and By-Laws. Shall we take up some of these in a later issue of the JOURNAL.

R. M.

* Copies of the Constitution and By-Laws are sent to each new member of A.S.M.T. Members may write to the Executive Office and request a copy if they don't have one on file.

STATE SOCIETIES

To bring the list of state officers up to date (See Master List in November, 1949, issue):

GEORGIA: Treasurer: Carolyn Martin, 1201 Clifton Road, N.E., Atlanta.
IOWA: Vice-President: Sister M. Mercedes, Mercy Hospital, Cedar Rapids.
MASSACHUSETTS: Secretary: J. Clare MacDonald, 45 Algonquin St., Dorchester.
MICHIGAN: Treasurer: Josephine Buss, Ferguson-Droste-Ferguson Clinic, c/o Laboratory, 72 Sheldon Ave., Grand Rapids.
OHIO: Treasurer: Bessie M. Keating, 55 W. Hebble Ave., Fairborn.
PENNSYLVANIA: President-elect: William Fisher, Medical Research Div., Sharp & Dohme, Glenolden. Recording Secy: Rose Antonucci, 731 N. 64th St., Philadelphia. Bd. of Directors: Mary Eichman, 440 Lyceum Ave., Philadelphia. Charlotte Taw, 46 N. Bryant Ave., Pittsburgh. Frances Griffin, 10 Logan Ave., Sharon. Myra Effinger, 407 Fifth St., Altoona. Ellen McDevitt, 1101 N. 63rd St., Philadelphia. Sr. M. Agnese (Vasco), St. Francis Hosp., Pittsburgh.

FROM THE PRESIDENT

Dear A.S.M.T. Members:

Happy New Year!

These words have rung in your ears many times in recent days. May they convey to you my sincere good wishes for happiness in your personal and professional lives during 1950.

And for A.S.M.T. my wish for the new year is for a happy and profitable one. May we as her members have initiative and enthusiasm for her advancement. May we have confidence and faith in one another and be deserving of that confidence and faith. May we have the strength and courage to carry out the purposes of our organization.

For each of you I wish that your association with A.S.M.T. will bring the richness of friendships that it has been my happy privilege to enjoy among her members.

Sincerely yours,
IDA L. REILLY.

UNESCO CONFERENCE EDUCATIONAL RECONSTRUCTION

Hunter College, New York

Some organizations from a mailing list of over 700 were selected and invited to send a representative to the Conference on November 10, 1949.

One of the important purposes of calling this Conference was to impart up-to-date information on the program of major needs and the best organization projects as designed by the Reconstruction Department of UNESCO and the Committee on Educational Reconstruction of the United States National Commission for UNESCO.

The first part of the session was devoted to a brief review of the recovery progress of the past few years. This included the various plans for aid and projects which have been launched to help restore the educational, scientific and cultural life in the devastated war countries. Vivid word descriptions of the pitiful conditions in many of the war torn areas as well as the desperate appeals for specific help were reported by several members of the Committee. A few referred to the fine leadership and direction of Jaime Torres Bodet, Director General of UNESCO. Perhaps a good summation of Mr. Bodet's awareness of the situation may be given by quoting one of his statements issued from the Paris office—"Much has been accomplished in the three short years since the war. But the faint SOS signals are still going up wherever men have watched the work of centuries crumble in seconds. Will YOU answer them?"

There was a presentation of additional details on the transportation of goods donated and another on the official Statement for UNESCO (a sample copy of this was given to each organization representative) which is to be used when donations are remitted to finance (in full or in part) one or more of the various types of aid, such as, fellowships, laboratory equipment and supplies, books and periodicals.

The last portion of this session was assigned to a group of well-informed speakers for giving explanatory data and to lead discussion relative to the Reconstruction Projects. The highlights of the information presented were:

1. UNESCO CARE Book Plan. A distinguished committee has selected 1300 titles (95% publications in English) in the following categories: Health and Welfare, Medicine, Dentistry, Applied Science, Nursing, Agricultural Science, Veterinary Science, and English language instruction. Titles and categories are being kept current and will be expanded as the need arises. This project is primarily a program for contributions from the general public and voluntary organizations. When funds are available requests from overseas are filled. It was pointed out that for $10 a donor can designate the library or institution to which his professionally selected package of books will be sent.

2. Fifty UNESCO International Fellowships is a goal set by the Committee. It was the general belief that persons already in administrative positions would be selected for these fellowships in Natural and Social Science, Cultural activities, and massive communications. The speaker presenting this information concluded with the comment, "I make an unabashed appeal for $3000" (each fellowship costs between $3000 and 4000).

3. Cultural Equipment. The information was given that artists and musicians need cultural tools. The need is acute. Among the various highly acceptable items are art kits, records and players, instruments of all kinds—brass and woodwind sections are not procurable in Europe.

4. Audio Visual Aids and Recreation Equipment. High on the priority list of every country are these aids—radios, phonographs, projectors, films, maps, globes, and press needs. Much of this equipment will be desired by those who return from fellowship study.

5. Vocational Education Equipment. There is still evidence of the lack of tools to satisfy the ingenuity of the people. Also, equipment for schools for teaching of woodwork, sewing, cooking, machine shop, business administration, is on the list of needs.

6. Scientific Equipment. As we all knew the losses were immense. Despite the heroic efforts of scientists, teachers, and administrators in the war devastated countries, equipment for all levels of chemistry, physics, medicine, and biology for teaching and research are needed. Needs range from test tubes and beakers to microscopes and colorimeters. A few of the concluding remarks of the session consisted of such advice as: The Committee recognizes that most individuals and organizations prefer to make gifts of money, some may select to undertake a project of donating used books or equipment. In view of this, the following important instruction was given, namely, that collections (as books) should not be made until information has been secured on the need and transportation. The UNESCO Reconstruction Liaison Officer at 405 East 42nd Street, New York City, New York, will be pleased to furnish any group (or individual) with the proper information or refer you to the agency in charge (for example, CARE's Book Program, 20 Broad Street, New York).

Dr. Kenneth Holland, U. S. Representative at UNESCO, Paris, closed the evening session of the Conference with a most interesting and in part of a less serious tone (such as, experiences with the different life in Paris relative to housing, transportation, food deliveries, etc.) address, "An American in Paris."

MARY F. EICHMAN, M.T. (ASCP)
A.S.M.T. Representative.

LABORATORY WORKERS IN SWITZERLAND

As a matter of possible interest to our readers, we quote from a letter which answered our question in regard to the status of laboratory workers in Switzerland: There are "no federal regulations on the subject (of laboratory workers). Each employer must however, give some precise advantages to his employees; to married persons, he must allow 20 Swiss francs a month for each child; as for the oldness-insurance-fund, the employer and the employee must both give 2% of their fee each month (this is obligatory, as well as the children-allowances). The employee is obliged to have an insurance for the cessation of work; the monthly price of this insurance can be what the employee desires. At last, there is also an insurance against work-accidents which the employer is obliged to have for his employees."

ANNOUNCEMENTS

The HAWAII Society of Medical Technologists is "in the making." Ten members were present at the November 30 meeting at the Kapiolani Hospital Nurses' Home. This was the second preliminary meeting. Another was held on December 8, with the first regular meeting called for January 11, 1950. Congratulations to our first territorial organization! Will Hawaii be affiliate No. 44?

The COLORADO S.M.T. is sponsoring a series of refresher courses on laboratory procedures. The MONTANA S.M.T. is holding their annual meeting in March to coincide with a refresher course in Microbiology sponsored by the State Board of Health. They have booked the A.S.M.T. exhibit for their meeting. The MARYLAND S.M.T. sent a representative to the Baltimore Southern High School Career Conference, and has otherwise made their program one of recruitment primarily. They arranged the program for the Technologists' Section held during the Maryland, District of Columbia, and Delaware Hospital Association meeting held in Wilmington, Del., November 14, 1949. The MISSOURI S.M.T. held their fall meeting on October 30, 1949, in Kansas City, with an attendance of about 70. They will meet with the Missouri Medical Association in St. Louis, on March 26-29, 1950. They also have booked the A.S.M.T. exhibit for this meeting. Has your society done the same? The IOWA S.M.T. held a fall meeting at the Hotel Savery, Des Moines, on November 19, 1949. Mrs. Lucille Wallace, the Chairman of A.S.M.T. Membership Committee spoke at their luncheon. The KANSAS S.M.T. held a Board meeting in Wichita on November 7, 1949, at which time they announced the University of Kansas Extension Program for Medical Technologists on January 23 through 25, 1950. Among the speakers were Dr. Israel Davidson, Chicago, Dr. F. William Sunderman, Houston, and Dr. Russell L. Haden, Virginia. The MICHIGAN S.M.T. held its annual convention in Detroit, last October.

The INDIANA-OHIO-KENTUCKY Seminar on Medical Mycology held at the Sinton Hotel Ballroom, Cincinnati, Ohio, was very successful. Two hundred and twenty-three registered. Of these there were two pathologists and thirteen physicians who were attending the meeting of the Southern Medical Association and two hundred eight medical technologists (thirty-eight students). A chartered bus went from Louisville, Kentucky.

A luncheon preceded the seminar. The introductions were made by Miss Mary Benedict Clark, president of the Kentucky Society of Medical Technologists. Miss Ruth Bluemlein, president of the Greater Cincinnati Society of Medical Technologists gave a cordial welcome followed by a response from Miss Gladys Bainaka, president of the Indiana Society of Medical Technologists. Mrs. Berttina Orsbourne, president of the Ohio Society of Medical Technologists reported on the number of registrants.

Sister Mary Simeonette of Nazareth College, Louisville, Kentucky, who was chairman of the program committee of the seminar, introduced the speaker, Dr. Donald S. Martin from Duke University Medical School, Durham, North Carolina.

Dr. Martin gave a complete lecture on medical mycology, showed a splendid assortment of lantern slides, set up slides of various pathogenic fungi under thirty microscopes. The pleasing personality and kindly help of Dr. Martin, besides the thoroughness of his lecture added much to the success. He will be remembered with grateful appreciation by those attending the seminar from Indiana, Ohio and Kentucky.

Gratitude acknowledgements were made by Miss Clark to the Education Fund Commitetee of the American Society of Medical Technologists and to the Board of Registry of the American Society of Clinical Pathologists through whom a grant had been received which made the seminar possible.

NOTICE FROM PROGRAM COMMITTEE

Did you read your November Journal? If so you already have an idea of some of our Program Material as stated in the pre-Convention Thoughts by our Executive Secretary. We want again to list the AVAILABLE AWARDS and the Program Rules.

1. Awards from Board of Registry for Scientific Papers and Scientific Exhibits.
2. A.S.M.T. Convention Awards for Scientific Papers and Scientific Exhibits.
3. The Hillkowitz Memorial Contest.

Program Rules:

1. The deadline date for papers to be received by the Program Committee from individuals desiring to present papers in Houston and likewise to compete for the Convention Awards is March 15, 1950.
2. Only A.S.M.T. members are eligible to compete for Convention Awards. All competitive papers must be presented in person or by proxy at convention time.
3. All Papers read or submitted to the Society become the property of A.S.M.T. and may be published in the American Journal of Medical Technology.
4. The time limit for reading the paper on the Program is 15 to 20 minutes exclusive of showing slides—the remainder of approximately 30 minutes is to be given to discussion.
   Papers may be longer and abstracted for Program purposes.
5. All audio-visual aids and professional technicians to operate them will be supplied by the Speakers Supplies Committee. Standard lanterns (3¼ by 4) will be furnished unless otherwise requested. Please indicate what aids are needed.
6. Five (5) copies of your manuscript must be submitted to the Program Committee Chairman. These must be typewritten, double spaced on regular size typewriter paper.
7. Two (2) copies of the manuscript must be submitted by all those not competing for A.S.M.T. Awards and subject to the above instructions.
8. Prize Papers from State contests to be considered for presentation and further awards, must be in the hands of the Program Committee Chairman by March 15, 1950.

PROGRAM COMMITTEE:
Lucile Harris, Chairman, Hendrick Memorial Hospital, Abilene, Texas.
John N. Frazer, The Street Clinic, Vicksburg, Mississippi.
Martha A. Lee, 5465½ Tilden Avenue, Van Nuys, California.
Homer L. Spencer, Medical Arts Laboratories, Tulsa, Oklahoma and
Mary Nagai, Box 26, Almeda, Texas.

SCIENTIFIC EXHIBITS

Have you reserved space for your convention exhibit with Mrs. Olive Polen, 1529 North 5th St., Waco, Texas? She is anxious to be able to list the title of your exhibit in the May issue of the journal, and she should have it before that time so that it will not be left out of the main program. See above (Program Committee) the list of awards for exhibits as well as those for papers.

MEMBERSHIP

How many of the fall registrants have already become members of your society? Have you added your invitation to the one sent out in the form of a letter from the president of A.S.M.T., and the copy of the Information Booklet? Information Pamphlets are available for the asking from the Executive Office, 6544 Fannin St., Houston 5, Texas.

CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

The CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS will hold their annual convention at the Admiral Beatty Hotel, St. John, N. B., on June 26 through 28, 1950. An invitation is extended to all those interested in attending. For further information please write Miss Charlotte Barron, 20 Enterprise St., Moncton, or Sr. Theresa Carmel, St. Joseph's Hospital, St. John, N. B.

CORNELL UNIVERSITY MEDICAL COLLEGE

Course in Exfoliative Cytology for Laboratory Technicians,
March 20-April 1, 1950

This course will be given under the supervision of George N. Papanicolaou, M.D., with the active cooperation of members of his staff. The purpose of the course is to familiarize technicians with the methods of preparing and staining smears of various body fluids and give them instruction in the principles of screening such smears. Applications will be considered only from qualified technicians employed by a Hospital or Laboratory where this technique is in use or is expected to be in use. Tuition $100.00.

Inquiries should be directed to Miss Charlotte M. Street, Cornell University Medical College, 1300 York Avenue, New York 21, N.Y. Application blanks will be furnished on request and must be returned by February 20, 1950.

Enrollment will be limited.

UNIVERSITY OF CALIFORNIA MEDICAL SCHOOL

San Francisco, California

The Medical Center
Parnassus and 3rd Avenues

NOTICE TO LABORATORY TECHNICIANS

The University of California Medical School, Medical Center, San Francisco, is offering a course of training in the staining and screening methods of exfoliative cytological diagnosis of cancer. The applicants are to be medical laboratory technicians or adequately prepared persons who can submit a statement of employment or a promise of engaging in this type of work under a pathologist who intends to perform such diagnostic procedures in quantity. The course is to last four months, which time is to be divided between the two cytological laboratories at the University of California Hospital, Medical Center, and at the San Francisco County Hospital, 22nd and Portrero Streets.

These laboratories and the course will be under the supervision of Dr. Herbert F. Traut, Professor of Obstetrics and Gynecology, one of the co-founders of the present technique, who, with Papanicolaou, demonstrated its practicability and usefulness; Dr. James F. Rinehart, Professor of Pathology; and Dr. Seymour M. Farber, Assistant Clinical Professor of Medicine.

The present plan is to accommodate four student technicians, although this number may be increased in the future. The beginning date will be determined upon after a sufficient number of applications are received. The first two weeks will be a probationary period at the end of which an examination will be given to determine the proficiency of the student for further training. It should be pointed out that since this work calls for long periods of attentive searching through the microscope, some otherwise perfectly capable laboratory workers might not find it congenial.

There will be no tuition or laboratory fee. A limited number of scholarships for an apprenticeship stipend will be available for California residents. These include $190.00 per month and travel expense not to exceed $50.00.

The present laboratory personnel consists of five full-time physicians experienced in the method, eight experienced technicians, and a number of physicians and medical students who have been devoting part of their time to special applications of the method. After a preliminary period of formal teaching, student technicians will engage in the usual duties, under supervision, of staining, mounting, and screening of slides and will aid in the procuring of specimens and the keeping of records. Cells of interest are generally and informally discussed as they appear.

The course is not intended to, and cannot make the student technicians proficient in the diagnosis of cancer cells, but should prepare them for the detection of typical suspicious, and diagnostic cells and clusters so that these may be studied by the pathologists in charge.

Application blanks may be obtained from and queries addressed to Milton Rosenthal, M.D., Office of Medical Extension, University of California Medical Center, San Francisco 22, California.

Pathologists are invited to study our material at any time. Interested physicians are welcome to spend as much time as they wish in the laboratories. Provision can probably be made for working in the evening if this is desired.

U. S. Public Health Service

SCHEDULE OF LABORATORY TRAINING COURSES

Jan. 1 — Dec. 31, 1950

Dates	COURSES	Duration	Program & Location Number*
Jan. 9—Jan. 13	Serological Diagnosis of Rickettsial Diseases	1 Wk.	8.75–8
Feb. 13—Feb. 44	Identification of Medically important Arthropods	2 Wks.	8.10–1
Mar. 27—April 14	Laboratory Diagnosis of Parasitic Diseases Part 1. Intestinal Parasites	3 Wks.	8.00–1
April 17—May 5	Laboratory Diagnosis of Parasitic Diseases Part 2. Blood Parasites	3 Wks.	8.01–1
May 8—May 12	Laboratory Dignosis of Rabies	1 Wk.	8.26–1
May 22—May 26	Laboratory Diagnosis of Bacterial Diseases (Directors)	1 Wk.	9.34–8
May 29—June 2	Laboratory Diagnosis of Mycotic Diseases (Directors)	1 Wk.	9.35–8
June 5—June 9	Laboratory Diagnosis of Tuberculosis (Directors)	1 Wk.	9.36–8
June 12—June 16	Laboratory Diagnosis of Parasitic Diseases (Directors)	1 Wk.	9.33–1
July 24—Aug. 4	Laboratory Diagnosis of Mycotic Diseases Part 1. Cutaneous and Subcutaneous Fungi	2 Wks.	8.60–8
Aug. 7—Aug. 17	Laboratory Diagnosis of Mycotic Diseases Part 2. Systemic Fungi	2 Wks.	8.61–8
Aug. 21—Sept. 7	Laboratory Diagnosis of Tuberculosis	3 Wks.	8.55–8
Sept. 11—Sept. 22	Laboratory Diagnosis of Bacterial Diseases General Bacteriology, Part 1.	2 Wks.	8.40–8
Sept. 25—Oct. 6	Laboratory Dignosis of Bacterial Diseases General Bacteriology, Part 2	2 Wks.	8.41–8
Oct. 9—Oct. 13	Laboratory Dignosis of Enteric Diseases Part 1. Introductory Enteric Bacteriology	1 Wk.	8.50–8
Oct. 16—Oct. 27	Laboratory Diagnosis of Enteric Diseases Part 2. Advanced Enteric Bacteriology	2 Wks.	8.51–8
Sept. 18—Oct. 6	Laboratory Diagnosis of Parasitic Diseases Part 1. Intestinal Parasites	3 Wks.	8.00–1
Oct. 9—Oct. 27	Laboratory Diagnosis of Parasitic Diseases Part 2. Blood Parasites	3 Wks.	8.01–1
Nov. 13—Nov. 24	Indentification of Medically Important Arthropods	2 Wks.	8.10–1
Nov. 13—Nov. 17	Virus Isolation and Identification Techniques	1 Wk.	8.22–9
Nov. 20—Nov. 24	Laboratory Diagnosis of Influenza	1 Wk.	8.25–9
Nov. 27— Dec. 1	Laboratory Diagnosis of Rabies	1 Wk.	8.26–9
By Special Arrangement	Laboratory Diagnosis of Malaria	2 Wks.	8.05–1
	Laboratory Diagnosis of Virus Diseases	2-4 Wks.	8.20–9
	Phage Typing of Salmonella Typhosa	1 Wk.	8.52–8

* Refers to System of Code Numbers of Laboratory Training Programs and Locations of Training Laboratories.

Information and applications may be obtained from the Chief, Laboratory Division, Communicable Disease Center, 291 Peachtree St., N.E., Atlanta, Ga.

REPORT OF THE PUBLIC RELATIONS COMMITTEE

June 1949 to December 1949

The Public Relations Committee of the A.S.M.T. had its inception at the 1949 Convention at Roanoke, Va. At this time the House of Delegates passed a resolution submitted by the Texas delegation, protesting the use of the term "Technician-Nurse," as adopted at the Baylor University School of Nursing, in connection with a new course for high-school graduates (similar to Practical Nurses).

The Public Relations Committee was delegated to send letters of protest to "all State Graduate Nurse's Associations, all State Leagues of Nursing Education, all State Hospital Associations and to Miss Lula K. Wolf, Nursing Educator Chairman of the U. of California, Los Angeles." Also, to ask the American Society of Clinical Pathologists and members of the Board of Registry to protest the use of the term.

Following investigation, by the Committee, of the situation which called forth the presentation of the resolution, correspondence with a number of "key individuals" who instigated the course and the terminology employed, discussion with Dr. Montgomery and Dr. Brines (Pres. A.S.C.P.) the protest letters were sent out in Sept. 1949. 162 letters were sent, which included, not only the above listed Associations, but also a number of Editors of Hospital publications, the American College of Hospital Administrators, and the six National Nurse's Associations.

The results of this first piece of work by the Public Relations Committee, and conclusions drawn from letters received in reply to our correspondence are as follows:

a.) All state nurse's Associations heard from to date, approved the resolution and agreed not to use the term in their states.

b.) Dean of Baylor University School of Nursing did not agree to make any changes in terminology.

c.) All Pathologists consulted, including Dr. Hill of Baylor University, Dr. Montgomery and Dr. Brines, advised that we make a concentrated effort to drop the use of the word "technician" ourselves, and adopt the correct term of Medical Technologist for our own use, attempting to publicize the **exclusive** use of this title in connection with our group.

Upon completion of the first task assigned to this committee, we next have turned our attention to possible future projects. Since the committee is young and new, with no precedents as yet established, or duties outlined in the Constitution, the rest of the year may very well become a period of study and of preparation for, and investigation of the many possibilities which come within our scope.

We have already learned that one of our chief functions is PUBLICITY of the **right** kind, and our Society and Profession do indeed need much of that type of work done. In doing this, however, we need the help of all ASMT members. We would like to have you all come to us with YOUR publicity problems, and we will see what we can do to help you.

Many of our "publicity plans" are still in embryo, but with the cooperation, interest and enthusiasm of the entire A.S.M.T. membership, your Public Relations Committee hopes to see to it that the whole world knows exactly WHO we are, WHAT we do, and WHAT we stand for, and that by these means we will take our rightful place in the PROFESSIONAL world.

Any and all ideas will be welcomed and will receive careful attention from: YOUR Public Relations Committee.

Miss Frieda H. Claussen, 469 Laurel Ave., St. Paul 2, Minn. (Chairman).
Miss Mary Nix, 4931 N.E. Glisan, Portland, Oregon.
Miss Lavina B. White, Pueblo Clinic, Pueblo, Colo.
Miss Doris Boon, 1588 Ansel Road, Cleveland, Ohio.
Miss Josephine Pyle, Middlesex Hospital, Middletown, Conn.

RESEARCH COMMITTEE ACTIVITIES

The rating of a professional organization in any branch of science is usually based on the quality of the research work performed by its members. Excellent examples of this statement are the "American Chemical Society" and the "Society of American Bacteriologists" who have attracted members of national and international reputation in their chosen professions.

The Research Committee of the American Society of Medical Technologists believes that there are many phases of medical technology that can be improved by additional investigative work, and we feel that our members are in a particularly good position to make valuable contributions along these lines. However, research budgets in most institutions are usually quite limited and, if we hope to accomplish research in medical technology, we must obtain financial aid from outside sources.

The Research Committee of "A.S.M.T." has formulated a plan for raising funds for research in medical technology through grants of money pledged by large pharmaceutical organizations. We have no way of knowing how successful this plan will be, but it is certainly worth a try. Our plan has been submitted to one pharmaceutical company along with a request for a pledge of $500.00, and other companies will soon be approached. If we are able to obtain grants of money in this manner, it should be borne in mind that these funds are in no sense a prize, but are being offered to defray the expenses of a worthwhile research program.

The members of your Research Committee are always anxious to assist you in technical problems, and the services of the following people are always available to the members of "A.S.M.T."

1. Mr. Elvyn Scott (as yet unassigned)
   Delaware Hospital, Wilmington 13, Del.
2. Miss Ruth Guy (as yet unassigned)
   William Buchanan Blood Center,
   Baylor Hospital, Dallas 1, Texas.
3. Miss Dorothy J. Hitchcock—Parasitology
   158 Orchard St., East Lansing, Mich.
4. Mrs. Hazel Sussenguth—Serology
   1883 East 101st St., Cleveland, Ohio.
5. Mr. Forrest Cross—Mycology
   Div. of Tuberculosis, Federal Security Agency,
   Washington 25, D. C.
6. Mr. Hartzell Payne—Bio-Chemistry
   Dept. of Research, Commercial Solvents Corp.,
   Terre Haute, Indiana.

In addition to the services offered by the members of your Research Committee, Mr. Cross has obtained the services of the following specialists:

Dr. Arden Howell—Mycology
Duke University School of Medicine

Dr. Carroll E. Palmer—Medical Statistics and Tuberculosis
Medical Officer in Charge of Office of Field Studies,
Tuberculosis Control Div., U. S. Public Health Service & Medical Statistician,
Washington 25, D.C.

Mr. Edward Weiss—Bio-Statistician
U. S. Public Health Service, Washington, D. C.

Miss Jennie Goddard—Graphic Specialist
U. S. Public Health Service, Washington, D.C.

A brief summary of the purpose of the Research Committee is to stimulate research among the members of A.S.M.T. We hope to accomplish this goal by:

1. Providing funds for worthwhile research projects;
2. Obtaining the services of special consultants who are outstanding in their respective professions.

At this time I would like to express my appreciation for the excellent suggestions and cooperation extended by the members of the Research Committee of A.S.M.T.

HARTZELL G. PAYNE,
Chairman, Research Committee.

NOMINATIONS AND ELECTIONS COMMITTEE

The Nominations and Elections Committee to date has circulated requests to all the affiliated organizations, officers and numerous committee chairmen asking for suggestions for the slate for the coming year. Notices have appeared in the Journal soliciting similar information. The committee is now studying the prospects preparatory to formation of a slate which they plan to have ready by Feb. 10th.

Respectfully submitted,
HENRIETTA M. LYLE, Chairman.

FINANCE COMMITTEE REPORT

Finance Committee authorized the disbursement of two hundred dollars ($200) for the Society's representatives' expenses incurred in attending the Board of Registry and A.S.C.P. meetings in October, 1949.

The division of the Committee Fund, $1200, was completed and approved as follows: Constitution-By-Laws, $125; Education, $450; Finance, $25; Legislation, $25; Membership, $500; Nominations-Elections, $25; Research, $25; Standard-Studies, $25. Public Relations Committee (from Special Committee Fund as set up in approved budget) $50. Each Committee Chairman was sent a notice of these allotments.

Respectfully submitted,
MARY F. EICHMAN, M.T. (ASCP)
Chairman, Finance Committee 1949-50.

MEMBERSHIP COMMITTEE

During the past quarter the Membership Chairman attended a meeting of the Iowa Society of Medical Technologists which should soon result in the addition of the 44th affiliated state society. Our first territorial society is in the throes of organization—that of Hawaii. Information Pamphlets were sent to all new registrants with notice of their certification. These have resulted in many new applications for membership. Nearly 500 of the 655 new members have come into A.S.M.T. this quarter. About three-fourths of these are older registrants. The new members who wish to pay the full five dollars even though their applications are received after January 1, will receive the July, September, and November issues of the journal.

The activity of the state membership committees for the next quarter will be directed toward those people who were A.S.M.T. members until 1948-49 (i.e., those who paid dues through 1947-48), to see why they dropped their membership. Of course, the new registrants will not be neglected, either, but they are more likely to join if they have received the applications. The state chairmen have also been urged to continue to follow these people, and not to lose touch with those whose addresses have been changed since their registration.

LUCILLE WALLACE, Chairman
R. R. No. 1
Cass Lake, Minnesota.

COMING CONVENTIONS

Coming Conventions: A.S.M.T., Hotel Shamrock, Houston, Texas, June 12-15, 1950.
CALIFORNIA S.M.T., April 29-30, 1950.
MASSACHUSETTS Assn. M.T.: Hotel Kenmore, Boston, May 6-7, 1950.
MINNESOTA S.M.T.: St. Paul, May 17-19, 1950.
MISSOURI S.M.T., St. Louis, March 26-29, 1950.
MONTANA S.M.T., Missoula, March 9-12, 1950.
PENNSYLVANIA S.M.T. and L.T., Pittsburgh, April 15, 1950.
TEXAS S.M.T., Houston, June 11, 1950 (House of Delegates with remainder of meeting in conjunction with A.S.M.T.).

THINKING ABOUT OUR CONVENTION?

There's one thing bothering me—who'll do the lab work all over the country when all you A.S.M.T. members come to Houston next June for the National Convention? I'm sure you'll all be here when you find out the fine program and the wonderful entertainment in store for you. The program will include many grand talks and will be revealed in its entirety later.

Now I'll admit that down here in Texas we're prone to exaggerate but just wait until you taste some of our barbecue, or see the Texas National Shrine, San Jacinto Battleground, or enjoy a dinner in the Emerald Room at the Shamrock Hotel. You'll agree with us.

By the way, have all of you ordered your seals to use on your correspondence? These will be especially nice to use on your local or state bulletins, and in other ways to tell the where and the when of the A.S.M.T. annual convention. They're a cent apiece, or you can get 500 for $4.50, or 1000 for $7.50. Order them from Frances Martyn, M.T. (ASCP), Baylor University College of Medicine, Houston 5, Texas.

Well, this is all for the time. I'll see you in the next issue with a few more top secrets to reveal.

The Publicity Chairman
Frances Martyn

AND POSSIBLE POST-CONVENTION VACATIONS

The Harvey Travel Bureau of 3501 Main, Houston, Texas, is the official tour operator for a Post-Convention tour to Mexico via Pan American World Airways. Or if any of our members prefer to try a Dude Ranch, they will be happy to send literature, make recommendations, and complete reservations. Since the convention takes place in June, the time is ideal to combine business and pleasure, and take that long-anticipated vacation to Mexico or Guatemala.

HOUSTON TO MEXICO CITY—ONLY 4 HOURS BY AIR

See ad elsewhere in this issue.

NOR IS IT TOO EARLY TO START MAKING THOSE HOTEL RESERVATIONS

for June 12 through June 15, 1950

At the Hotel Shamrock, Houston, Texas. Make your reservations direct with the hotel. With every room individually air-conditioned, you are assured of complete comfort; and with every room radio-equipped, and television available, your in-the-room entertainment is guaranteed.

Rates: Single: $6-$16.

2. Double: or Twin Beds: $8-$18. Single or Double Occupancy.
3. Suite: Room with Boudoir: $10-$20. Single or Double Occupancy.
4. Suite: Parlor and Bedroom: $18-$30. Single or Double Occupancy.
5. Suite: 3 and 4 Room with Boudoir: $30-$40. Single or Double Occupancy. Add $3 for each additional person in 2, 3, 4 or 5.

If a sufficient number of Sisters wish hotel accommodations, a separate block of rooms will be reserved for them. For Sisters' reservations, write to Sister M. Aniceta, St. Joseph's Infirmary, Houston 3, Texas.

For reservations outside the hotel, write Miss Shige Nagai, 6608 Plaza Drive, Houston 4, Texas.